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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of California-American Water
Company (U210W) for Authorization to Increase
its Revenues for Water Service by \$55,771,300 or
18.71% in the year 2024, by \$19,565,300 or 5.50%
in the year 2025, and by \$19,892,400 or 5.30% in
the year 2026.

Application 22-07-XXX

DIRECT TESTIMONY OF DAVID MITCHELL
(FINAL APPLICATION)

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Dated: July 1, 2022

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1 **BEFORE THE PUBLIC UTILITIES COMMISSION**
2 **OF THE STATE OF CALIFORNIA**

3
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6 its Revenues for Water Service by \$55,771,300
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8 5.50% in the year 2025, and by \$19,892,400 or
9 5.30% in the year 2026.

Application 22-07-XXX

10 **DIRECT TESTIMONY OF DAVID MITCHELL**
11 **(FINAL APPLICATION)**

12 **I. BACKGROUND**

13 Q1. Please provide your name, position, and business address.

14 A1. My name is David Mitchell. I am a General Partner at M.CUBED. My business address
15 is 5358 Miles Avenue, Oakland, CA 94618. M.Cubed is an economic consulting firm
16 founded in 1993. M.Cubed provides economic and public policy consulting services to
17 public and private sector clients. Practice areas include water and energy utility resource
18 planning and ratemaking, resource use efficiency and conservation measures, project
19 impact analysis, regional economic modeling, natural resource allocation policies, and
20 environmental plan preparation and review. Clients include private industry; federal,
21 state, and local government; and trade associations.

22
23 Q2. Please state your education and professional background.

24 A2. I have a Bachelor of Science from the University of California, Berkeley in Political
25 Economy of Natural Resources. I also hold a Master's of Science in Natural Resource
26 and Agricultural Economics from the University of California, Berkeley. I am also an
27 Adjunct Fellow with the Public Policy Institute of California.
28

I am a founder and principal of M.Cubed. I have been deeply involved in urban water resources planning and evaluation for 30 years and I have had a direct hand in shaping many of the policies and technical resources guiding urban water conservation planning and program implementation in California. I have developed numerous planning models and tools for conservation program analysis, water demand forecasting, rate design, and revenue analysis. Over the years, I have worked with numerous water districts, municipalities, and investor owned utilities on water resources management and conservation planning. Representative clients include, in addition to California American Water, California Water Service, San Jose Water Company, East Bay Municipal Utility District, Santa Clara Valley Water District, Sonoma County Water Agency, Contra Costa Water District, Orange County Municipal Water District, the Metropolitan Water District of Southern California, San Francisco Public Utilities Commission, West Basin Municipal Water District, Eastern Municipal Water District, Irvine Ranch Water District, San Diego County Water Authority, and Placer County Water Agency. My resume is attached hereto as Attachment 1.

II. CLASS LEVEL SALES FORECASTS

Q3. What is the purpose of your testimony with respect to sales forecasts?

A3. The purpose of my testimony is to present class-level sales forecasts for the water districts California American Water operates for Test Year 2024 and Forecast Years 2025 and 2026.

Q4. Please identify the customer classes you considered.

A4. Separate sales forecasts were prepared for the following customer classes:

- Residential
- Multiresidential
- Commercial
- Industrial

- Public Authority
- Irrigation (gravity and pressure)
- Miscellaneous/other.

Q5. At a high level, what did you take into consideration in preparing the sales forecasts?

A5. Per Decisions 16-12-026 and 20-08-047, I considered the effects of water rates, secular trends in water use, climate, weather, drought, on-going conservation, and other factors influencing water use, such as the COVID-19 pandemic.

Q6. How did you create the sales forecasts?

A6. The sales forecast is generated by combining a forecast of customers with a forecast of average sales per customer. The forecast of customers is based on the most recent five-year average rate of growth in customers. Econometric models are used to forecast average sales per customer using customer-level monthly billing data. The econometric model estimates expected sales per customer, conditional on season and weather, marginal cost of water, drought-related restrictions on water use, effect of the COVID-19 pandemic, and customer-level attributes (so-called fixed customer-level effects).

Q7. Please summarize your findings.

A7. A copy of the report summarizing my findings, "California American Water Sales Forecast: 2022 General Rate Case," dated April 2022, is included as Attachment 2. The report describes the specification of the sales forecast model, the data used to estimate the model, and the estimation results. It also presents the district forecasts of customers, average sales per customer, and total sales for each customer class.

III. RATE DESIGN SIMULATION TECHNICAL MEMORANDUMS

Q8. What is the purpose of your testimony with respect to rate design?

1 A8. The purpose of my rate design testimony is to present results of simulations of alternative
2 class-level rate designs for California American Water's Northern, Central and Southern
3 Divisions. The simulations evaluated the impact of the alternative rate designs on
4 customer bills, water use, and system revenue variability relative to the current rate
5 design. This information was provided to California American Water to assist in
6 evaluating their proposed rate designs in this application.
7

8 Q9. Please describe the simulations that were performed.

9 A9. A copy of the report that summarizes my findings is included as Attachment 3 and is
10 titled, "California American Water Rate Design Bill Impact Analysis: 2022 General Rate
11 Case" dated April 2022. The report includes five technical memorandums ("TM") as
12 follows: (1) Southern Division TM; (2) Central Division TM #1, (3) Central Division TM
13 #2, (4) Northern Division TM #1, and (5) Northern Division TM #2.
14

15 **IV. AFFORDABILITY METRICS**

16 Q10. What is the purpose of your testimony with respect to affordability?

17 A10. The purpose of my affordability testimony is present the results of the Commission's
18 affordability metrics identified in Decision 20-07-032 based on California American
19 Water's present and proposed rates. The results are reflected in Attachment 4 to my
20 testimony, which is titled "California American Water Affordability Metrics: 2022
21 General Rate Case."
22

23 Q11. Does this conclude your testimony?

24 A11. Yes it does.
25
26
27
28

ATTACHMENT 1

David Mitchell

Education

MS, Agricultural and Natural Resource Economics, University of California, Berkeley, 1989

BS, Political Economy of Natural Resources, University of California, Berkeley, 1987

Years Experience

Thirty years of professional experience

Distinguishing Qualifications

- Founder and principal of economic consulting firm, M.Cubed
- Director of Research for the California Urban Water Conservation Council 1992-2007
- Thirty years of experience developing integrated water management plans for California's urban water suppliers
- Pioneered methods and analytical models now widely used to evaluate urban water conservation programs throughout California
- Lead economist for cost and finance studies of major environmental restoration initiatives, including the CALFED Bay-Delta Program, Bay Delta Conservation Plan, Lake Tahoe Environmental Improvement Program, and Santa Ana River HCP
- Extensive experience evaluating policies, programs, and natural phenomena impacting California's agricultural economy
- Adjunct Fellow Public Policy Institute of California

Relevant Experience

Mr. Mitchell has in-depth knowledge of the water supply, water quality and environmental management challenges confronting resource management agencies in the western United States. His practice areas include benefit-cost analysis, regional economic impact assessment, utility rate setting and financial planning, natural resource valuation, water demand forecasting, and water conservation program evaluation and planning. He has 30 years of experience using statistical and economic methods and models to help guide water resources management and investment decisions. He has been deeply involved in urban water conservation planning and evaluation since he became the California Urban Water Conservation Council's first Project Manager and Director of Research back in 1993. Serving for 15 years in this capacity, he has had a direct hand in shaping many of the policies and technical resources guiding urban conservation in California, including revisions to existing and creation of new urban water conservation Best Management

Practices (BMPs), development of BMP implementation guidebooks, cost-effectiveness guidelines and models, conservation rate guidelines, and design and oversight of numerous program evaluation studies. At the state level, he has provided economic modeling support to the California Water Fix, Bay Delta Conservation Plan, Delta Risk Management Strategy, CALFED Program. He has worked on numerous regional water planning efforts, including Sonoma County Water Agency's Fish Habitat Flows and Water Rights Project, EBMUD's 2040 Water Supply Master Plan, Contra Costa Water District's Future Water Supply Study Update, Sonoma County Water Agency's Water Supply, Transmission, and Reliability Project, and Metropolitan Water District's 2000 and 2005 Urban Water Management Plans. Mr. Mitchell has provided written and oral testimony in legal and regulatory proceedings concerned with the valuation and pricing of environmental resources. Water right valuations prepared by Mr. Mitchell have supported damage judgments in legal proceedings and have supported negotiated leases and sales of water.

Representative Projects

California Water Service 2021 General Rate Case Sales Forecast Testimony

California Water Service (2021-2022)

Prepared class-level sales forecasts for California Water Service's 24 service districts for Test Year 2023 and Forecast Years 2024 and 2025. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, passive and active conservation, and drought effects and recovery. The forecasts provided the basis for California Water Service's 2021 Rate Filing before the CPUC.

San Jose Water Company 2020 General Rate Case Sales Forecast Testimony

San Jose Water Company (2020-2021)

Prepared class-level sales forecasts for San Jose Water Company for Test Year 2022 and Forecast Years 2023 and 2024. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, passive and active conservation, and drought effects and recovery. The forecasts provided the basis for San Jose Water Company's 2020 Rate Filing before the CPUC.

California American 2019 General Rate Case Sales Forecast Testimony

San Jose Water Company (2019)

Prepared class-level sales forecasts for California American service areas for Test Year 2021 and Forecast Years 2022 and 2023. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, passive and active conservation, and drought effects and recovery. The forecasts provided the basis for California American's 2019 Rate Filing before the CPUC.

California Water Service 2018 General Rate Case Sales Forecast Testimony

California Water Service (2018)

Prepared class-level sales forecasts for California Water Service's 24 service districts for Test Year 2020 and Forecast Years 2021 and 2022. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, passive and active conservation, and drought effects and recovery. The forecasts provided the basis for California Water Service's 2018 Rate Filing before the CPUC.

Hawaii Water Service 2017 General Rate Case Conservation Program Testimony

Hawaii Water Service (2017)

Prepared district-level demand forecasts and conservation program designs, budget justifications, and staffing recommendations for the Ka'anapali and Waikoloa water service districts operated by Hawaii Water Service.

San Jose Water Company 2017 General Rate Case Sales Forecast Testimony

San Jose Water Company (2017)

Prepared class-level sales forecasts for San Jose Water Company for Test Year 2019 and Forecast Years 2020 and 2021. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, passive and active conservation, and drought effects and recovery. The forecasts provided the basis for San Jose Water Company's 2017 Rate Filing before the CPUC.

California Water Service 2015 General Rate Case Sales Forecast Testimony

California Water Service (2015)

Prepared class-level sales forecasts for California Water Service's 24 service districts for Test Year 2017 and Forecast Years 2018 and 2019. The forecasts are built up from forecasts of average use per customer and projections of total customers. The forecasts of average use per customer are derived from econometric models of average water use that account for the effects of climate and weather, strength of the economy, cost of water, and passive and active conservation. The forecasts provided the basis for California Water Service's 2015 Rate Filing before the CPUC.

California Water Service 2021 General Rate Case Conservation Program Testimony

California Water Service (2021)

Prepared district-level conservation program designs, budget justifications, and staffing recommendations for 24 water service districts operated by California Water Service.

California Water Service 2018 General Rate Case Conservation Program Testimony

California Water Service (2018)

Prepared district-level conservation program designs, budget justifications, and staffing recommendations for 24 water service districts operated by California Water Service.

California Water Service 2015 General Rate Case Conservation Program Testimony

California Water Service (2015)

Prepared district-level conservation program designs, budget justifications, and staffing recommendations for 24 water service districts operated by California Water Service.

California Water Service 2012 General Rate Case Conservation Program Testimony

California Water Service (2012)

Prepared district-level conservation program designs, budget justifications, and staffing recommendations for 24 water service districts operated by California Water Service.

Paying for Water in California

Public Policy Institute of California (2014)

Co-author of report on funding gaps in California's water management systems, including safe drinking water in small, disadvantaged communities, flood protection, ecosystem management, integrated water management, and stormwater and polluted runoff management. Identified magnitude of funding gaps in each management area and proposed policy reforms to address these gaps. Report download: <http://www.ppic.org/publication/paying-for-water-in-california/>

Building Drought Resilience in California's Cities and Suburbs

Public Policy Institute of California (2017)

Primary author of report examining California's cities and suburbs responses to recent droughts and local and state government's evolving roles in urban drought management. From a policy context, the report examines key areas for improving urban drought resilience, including coordinating water shortage contingency planning and implementation, fostering water system flexibility and integration, improving water supplier fiscal resilience, addressing water shortages in vulnerable communities and ecosystems, and balancing long-term water use efficiency and drought resilience. Report download: <http://www.ppic.org/publication/building-drought-resilience-californias-cities-suburbs/>

Managing Drought in a Changing Climate: Four Essential Reforms

Public Policy Institute of California (2018)

Co-author of report examining how hotter temperatures, shrinking snowpack, shorter and more intense wet seasons, and more volatile precipitation will stress the state's water management systems. The report provide a road map of essential reforms to prepare for and respond to droughts in California's changing climate. Key reforms include stronger drought planning, upgrades to state's water grid, improved water allocation rules, and development of new funding sources. Report download: <http://www.ppic.org/publication/managing-drought-in-a-changing-climate-four-essential-reforms/>

Model Design and Programming, Alliance for Water Efficiency Sales Forecasting and Rate Model

Alliance for Water Efficiency (2014)

With A&N Technical Services, developed the AWE Sales Forecasting and Rate Model, a new analytical tool that can explicitly model the effects of rate structures on urban water use. Typical water rate models assume that future sales are known with certainty, and do not respond to price, weather, the economy, or supply shortages – that is to say, not the world we live in. The AWE Sales Forecasting and Rate Model addresses this deficiency and enables analysis of the following: Customer Consumption Variability – weather, drought/shortage, or external shock;

Demand Response – Predicting future block sales (volume and revenue) with empirical price elasticities; Drought Pricing – Contingency planning for revenue neutrality; Probability Management – Risk theoretic simulation of revenue risks; Fiscal Sustainability – Sales forecasting over a 5 Year Time Horizon. Built in Excel with an extensive visual basic backend, the model's rate design and revenue simulation modules allow for a wide range of analyses of alternative rate designs.

ATTACHMENT 2



CALIFORNIA AMERICAN WATER SALES FORECAST

2022 General Rate Case



Prepared by
M.Cubed
Oakland, CA

June 2022

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Introduction

This report presents class-level sales forecasts for districts served by California American Water (Cal Am) for Test Year 2024. Per CPUC Decisions 16-12-026 and 20-08-047, the sales forecasts account for the effects of water rates, secular trends in water use, climate, weather, drought, and other factors influencing water use, such as the COVID pandemic.

The remainder of this report is organized as follows. In the next section we describe the specification of the sales forecast model, the data we used to estimate the model, and the estimation results. We then present the forecasts of total sales for each district and customer class.

This report is intended for sales forecasting and ratesetting purposes only. It is not intended for operational planning purposes.

Sales Forecast Model Specification and Estimation

The sales forecasts are generated by combining forecasts of services with forecasts of average use per service.

- Number of Services: The forecasts of services are generated by applying the average rate of growth in services to the current number of services in each service class. Adjustments are made if circumstances anticipated to cause growth to be faster or slower than this average rate exist. Such adjustments are described in later sections of the report.
- Average Use per Service: The forecasts of average use per service are derived from econometric models of average water use per service. The econometric models account for the effects of climate and weather, water rates, secular trends due to conservation and other factors, drought-related restrictions on water use, and the COVID pandemic. Separate models are estimated for the residential, multi-residential, commercial, and public authority service classes, which in combination account for about 97 percent of Cal Am's sales. Forecasts of average use per service for the other service classes (industrial, miscellaneous/other, and sales for resale) are derived from average use statistics for the last three years.

This is the same approach that was used to construct Cal Am's 2019 GRC sales forecast. A significant difference in this GRC compared to 2019, however, is the use of customer-level billing data to estimate the average use per service models. In the previous GRC, aggregated service class data on a monthly time-step were used to estimate average use per service. By transitioning the models to use customer-level billing data, they are able to leverage the significant within and across customer variation in water use to generate more robust estimates of key model parameters, in particular the sensitivity of sales to weather, drought water use restrictions, and changing water rates. Additionally, these panel-data models are able to detect the effect that the COVID pandemic is having on household and commercial water uses which is important for forecasting future water sales as the pandemic continues to evolve.

Districts and Service Classes

Cal Am districts and their service classes included in the sales forecasts are shown in Table 1. The Central Satellite systems in the Central Division include the Ambler, Garrapata, Ralph Lane, and Toro systems. The Dunnigan, Geyserville, and Hillview systems in the Northern Division have been aggregated into the Sacramento district. Likewise, the El Rio system in the Southern Division has been aggregated into the Duarte district. Monterey is presently the only Cal Am district that has separately classified active multi-residential services. In all other districts, multi-residential services are included in the commercial class.

Table 1. Cal Am Districts and Service Classes

Division	District	Single Resid.	Multi Resid.	Com.	Indust.	Public Auth.	Irrig.	Other	Sales for Resale	Fire Service
Central	Monterey	X	X	X	X	X	X	X	X	X
Central	Central Satellite	X		X		X		X		X
Central	Chualar	X		X		X		X		X
Southern	Baldwin Hills	X		X	X	X		X		X
Southern	Duarte	X		X	X	X	X	X		X
Southern	San Marino	X		X	X	X		X		X
Southern	San Diego	X		X		X		X		X
Southern	Ventura	X		X	X	X	X	X		X
Northern	Sacramento	X		X	X	X	X	X		X
Northern	Larkfield	X		X		X		X		X
Northern	Meadowbrook	X		X						X

X = District had services in this class in 2021

Central Satellite includes the Ambler, Garrapata, Ralph Lane, and Toro water systems.

Sacramento includes the Dunnigan, Geyserville, and Hillview water systems.

Duarte includes the El Rio water system.

Billing Data

Monthly billing data were used to estimate the service and average use per service forecast models. Table 2 summarizes the period spanned by these data as well as the number of services (top number) and average bills per service (bottom number in parentheses) in each data panel. In the Monterey district, for example, the data panel used to estimate the single-family residential forecast model is comprised of 34,520 services with an average of 92.5 bills per service. The total sample size is the product of the number of services and the average number of bills per service. Thus, in this case, the sample size is 3,193,100 monthly bills. These data span the seven-year period January 2014 through December 2021.

Table 2. Billing Data Panel Sizes

Division	District	Span	Single Resid.	Multi Resid.	Comm.	Public Auth.
Central	Monterey	Jan2014- Dec2021	34,520 (92.5)	1,758 (90.4)	3,263 (90.5)	538 (89.9)
Central	Central Satellite	Jan2014- Dec2021	462 (79.9)		27 (76.0)	2 (95.5)
Central	Chualar	Aug2016- Dec2021	172 (44.6)		5 (46.8)	2 (47.0)
Southern	Baldwin Hills	Jan2014- Dec2021	5,624 (89.2)		611 (87.9)	27 (84.5)
Southern	Duarte	Jan2014- Dec2021	6,634 (92.9)		591 (78.7)	131 (88.8)
Southern	San Marino	Jan2014- Dec2021	12,700 (90.6)		1,434 (80.5)	139 (90.7)
Southern	San Diego	Jan2014- Dec2021	18,093 (90.1)		1,896 (82.6)	328 (90.6)
Southern	Ventura	Jan2014- Dec2021	19,413 (95.1)		1,065 (77.8)	195 (94.5)
Northern	Sacramento	Jan2014- Dec2021	56,750 (91.2)		4,620 (80.1)	371 (92.0)
Northern	Larkfield	Jan2014- Dec2021	1,950 (85.1)		327 (80)	3 (95.7)
Northern	Meadowbrook	Apr2017- Dec2021	1,581 (53.2)		60 (40.9)	

Top number is the number of services in the panel. Bottom number in parentheses is the average number of bills per service. The product of these two numbers is the total number of monthly bills represented in the panel.

The panel data sample sizes in Table 2 constitute the final sample sizes after the raw billing data were screened for quality control purposes. Raw billing data are typically noisy and may include negative

values, missing values, and outlier values that can adversely impact model estimation. Therefore, a bill was dropped from the sample if any of the following conditions were present:

- Missing consumption value
- Negative consumption value
- Duplicate billing record
- Fewer than 20 or more than 90 days in the billing cycle¹
- Outlier consumption value²
- Robust regression data quality flag³

Additionally, a service was dropped from the panel if either of the following conditions were met:

- Service was active for less than one year
- Service had an excessive number of zero consumption meter reads⁴

Data screening typically removed less than five percent of the raw billing data, leaving 95 percent or more available for model estimation.

Some panels shown in Table 2 did not have a sufficient number of services or did not span a sufficient amount of time to support model estimation. These include the Public Authority panels for Central Satellite, Chualar, and Larkfield, and the Commercial panels for Central Satellite and Chualar. The average use forecasts are based on the 3-year average use per service in these cases.

Service Forecast Model and Forecasted Services

The service forecasts for each district are provided in Tables 3 through 13. With the exception of the Larkfield and Sacramento districts, these forecasts were generated by projecting forward 2021 services using the average rate of change in the number of services between 2015 and 2021.

In the case of the Larkfield and Sacramento districts, the single-family residential service forecasts are based on projections of new housing prepared for Cal Am by the Gregory Group. For the Larkfield district, this new housing construction is being driven by the on-going recovery from the 2017 Tubbs Fire. In the case of the Sacramento district, the new housing construction is due to the Riolo Vineyards development in the southern part of Placer County and the Rio Del Oro development in Rancho

¹ The average number of days in the billing cycle is 30.4 days.

² Monthly water use approximately follows a log-normal distribution. Thus, 99.7 percent of observed consumption should be within three standard deviations of the monthly mean on the log scale. A value outside of this range is treated as an outlier and removed from the sample.

³ Prior to final model estimation, robust regression techniques were used to detect observations containing potential data quality issues. Robust regression assigns weights between 0 and 1 to each observation based on its leverage and outlierness. Observations with weights less than 0.25 were not used for final model estimation.

⁴ Specifically, if the service was in the 95th percentile in terms of number of zero meter reads, it was dropped from the panel.

Cordova. Service forecasts for the other customer classes in these two districts are based on the average rates of change in the number of services between 2015 and 2021.

Table 3. Monterey District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	32,977	32,958	32,951	33,044	33,076	33,124	33,071	33,097	33,124	33,150	33,177	33,203
Multiresidential	1,719	1,719	1,723	1,721	1,731	1,733	1,729	1,731	1,734	1,736	1,738	1,741
Commercial	3,122	3,117	3,130	3,130	3,119	3,106	3,116	3,114	3,112	3,111	3,109	3,107
Industrial	4	4	4	4	4	4	4	4	4	4	4	4
Public Authority	506	507	506	504	505	506	507	507	507	507	507	507
Irrigation	163	166	166	167	167	167	166	166	167	167	168	168
Other	59	70	70	69	61	66	70	71	71	72	72	73
Sales for Resale	2	2	2	2	2	2	2	2	2	2	2	2
Fire	1,002	1,009	1,012	1,027	1,027	1,026	1,037	1,043	1,048	1,054	1,059	1,065
Total	39,554	39,552	39,564	39,668	39,692	39,734	39,702	39,735	39,769	39,802	39,836	39,869

Table 4. Central Satellite Systems Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	868	869	871	871	871	873	867	867	867	868	868	868
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	24	24	24	24	24	24	24	24	24	24	24	24
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Public Authority	2	2	2	2	2	2	2	2	2	2	2	2
Irrigation	1	2	2	2	2	2	1	1	1	1	1	1
Other	0	0	0	0	0	0	0	0	0	0	0	0
Sales for Resale	5	5	5	5	5	5	5	5	5	5	5	5
Fire	900	902	904	904	904	906	899	899	899	900	900	900
Total	868	869	871	871	871	873	867	867	867	868	868	868

Table 5. Chualar District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	184	185	185	183	184	183	183	183	182	182	182	182
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	6	6	6	6	6	6	6	6	6	6	6	6
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Public Authority	2	2	2	2	2	2	2	2	2	2	2	2
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Other	2	2	2	2	1	2	1	1	1	1	0	0
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	1	1	1	1	1	1	1	1	1	1	1	1
Total	195	196	196	194	194	194	193	193	192	192	191	191

Table 6. Baldwin Hills District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	5,578	5,574	5,573	5,578	5,581	5,590	5,580	5,582	5,583	5,585	5,587	5,588
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	601	598	600	601	600	600	600	600	600	600	600	600
Industrial	3	3	3	3	3	3	3	3	3	3	3	3
Public Authority	26	25	25	25	25	25	25	25	25	25	25	24
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Other	4	4	4	5	5	5	6	6	7	7	7	8
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	38	38	38	38	38	38	38	38	38	38	38	38
Total	6,250	6,242	6,243	6,250	6,252	6,261	6,252	6,254	6,256	6,258	6,260	6,261

Table 7. Duarte District Service Forecast

	Actual							Forecast				
										Test Year	Forecast Year	Forecast Year
Services	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Residential	6,559	6,552	6,567	6,574	6,560	6,570	6,576	6,579	6,582	6,585	6,587	6,590
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	617	618	621	638	634	632	638	642	645	649	653	657
Industrial	16	16	16	16	16	16	16	16	16	16	16	16
Public Authority	121	120	118	121	121	121	119	119	119	119	119	119
Irrigation	16	9	5	4	4	4	5	3	2	0	0	0
Other	7	7	7	7	5	6	8	8	8	8	8	8
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	139	141	143	146	146	147	148	150	151	153	154	156
Total	7,475	7,463	7,477	7,506	7,486	7,496	7,510	7,516	7,523	7,529	7,537	7,545

Table 8. San Marino District Service Forecast

	Actual							Forecast				
										Test Year	Forecast Year	Forecast Year
Services	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Residential	12,352	12,537	12,560	12,578	12,572	12,624	12,630	12,666	12,703	12,739	12,776	12,812
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	1,396	1,400	1,412	1,412	1,410	1,412	1,419	1,422	1,426	1,429	1,432	1,435
Industrial	46	45	42	40	42	43	44	44	43	43	43	42
Public Authority	139	138	138	137	132	132	131	130	128	127	125	124
Irrigation	0	1	1	1	1	0	0	0	0	0	0	0
Other	11	8	15	21	19	21	21	23	25	27	30	32
Sales for Resale	1	1	0	0	0	0	0	0	0	0	0	0
Fire	196	197	197	198	197	201	206	207	209	210	211	213
Total	14,141	14,327	14,365	14,387	14,373	14,433	14,451	14,492	14,534	14,575	14,616	14,657

Table 9. San Diego District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	18,278	18,376	18,590	18,757	18,785	18,864	18,874	18,980	19,085	19,191	19,297	19,402
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	2,162	2,160	2,166	2,164	2,164	2,173	2,178	2,181	2,183	2,186	2,188	2,191
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Public Authority	320	316	312	313	301	301	303	300	296	293	290	287
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Other	15	30	19	24	28	30	27	29	30	32	33	35
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	386	386	399	401	404	410	410	414	419	423	428	432
Total	21,161	21,268	21,486	21,659	21,682	21,778	21,792	21,903	22,014	22,125	22,236	22,347

Table 10. Ventura District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	19,274	19,300	19,303	19,322	19,326	19,317	19,333	19,341	19,350	19,358	19,366	19,375
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	1,112	1,129	1,134	1,134	1,136	1,141	1,138	1,142	1,145	1,149	1,153	1,157
Industrial	164	167	176	175	175	175	177	179	181	183	185	187
Public Authority	194	193	193	192	192	192	192	192	191	191	191	190
Irrigation	0	0	1	2	2	2	2	2	3	3	4	4
Other	10	6	9	5	8	6	4	3	3	2	1	1
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	340	334	338	334	337	338	341	341	342	342	342	343
Total	21,094	21,129	21,154	21,164	21,176	21,171	21,187	21,201	21,215	21,228	21,242	21,256

Table 11. Sacramento District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	53,042	53,157	53,560	53,918	54,059	54,108	54,281	54,502	55,242	56,432	57,554	58,749
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	4,853	4,873	4,888	4,895	4,912	4,928	4,947	4,962	4,977	4,992	5,006	5,021
Industrial	1	1	1	1	1	1	1	1	1	1	1	1
Public Authority	358	351	351	352	351	352	351	350	350	349	348	348
Irrigation	0	0	0	1	1	1	1	1	1	2	2	2
Other	15	15	15	15	16	16	16	16	16	17	17	17
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	871	869	876	885	888	890	888	892	896	899	903	907
Total	59,140	59,266	59,691	60,067	60,228	60,296	60,485	60,724	61,483	62,691	63,831	65,045

Table 12. Larkfield District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential	2,044	2,046	1,517	1,708	1,882	1,963	1,991	2,093	2,109	2,126	2,143	2,159
Multiresidential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	321	327	304	323	323	321	325	326	326	327	328	328
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Public Authority	3	3	3	3	3	3	3	3	3	3	3	3
Irrigation	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	1	1	1	1	1	1	1	1	1	1	1
Sales for Resale	0	0	0	0	0	0	0	0	0	0	0	0
Fire	52	53	48	53	53	54	54	54	55	55	56	56
Total	2,421	2,430	1,873	2,088	2,262	2,342	2,374	2,477	2,494	2,512	2,531	2,548

Table 13. Meadowbrook District Service Forecast

Services	Actual							Forecast				
	2015	2016	2017	2018	2019	2020	2021	2022	2023	Test Year 2024	Forecast Year 2025	Forecast Year 2026
Residential				1,651	1,654	1,656	1,656	1,658	1,659	1,661	1,663	1,665
Multiresidential				0	0	0	0	0	0	0	0	0
Commercial				58	58	57	60	61	61	62	62	63
Industrial				0	0	0	0	0	0	0	0	0
Public Authority				0	0	0	0	0	0	0	0	0
Irrigation				0	0	0	0	0	0	0	0	0
Other				0	0	0	0	0	0	0	0	0
Sales for Resale				0	0	0	0	0	0	0	0	0
Fire				13	13	13	13	13	13	13	13	13
Total				1,722	1,725	1,726	1,729	1,731	1,733	1,736	1,738	1,740

Average Sales Per Service Forecast Model

Average sales per service are forecast with econometric models of average sales conditional on season and weather, water rates, secular trend, and customer fixed-effects. The models include controls for drought-related water use restrictions and the effects of the COVID pandemic on average monthly water use.

Key aspects of the forecast models include the following:

- Monthly customer-level panel data are used to estimate the forecast models rather than monthly aggregated sales data. This means the models leverage the information from hundreds of thousands to millions of billing records to estimate key model parameters.
- Seasonal and weather effects are modeled as continuous functions of time through the use of Fourier series harmonics.⁵ This enables billing data to be precisely matched to weather data based on meter read dates which improves the accuracy and precision of the model's estimated weather coefficients.
- Weather effects are modeled as deviations from their expected value. For example, precipitation in January appears in the model as the difference between realized and expected precipitation in January.⁶ Weather effects are thereby made independent of seasonal effects. This allows the model to predict the change in average water use when rainfall or temperature are above or below their expected values.
- The model allows for interaction between the weather and seasonal components. Thus, weather effects can be allowed to vary over the year. For example, the model can be used to test whether the response in average water use to deviations in expected rainfall or temperature differ by season.
- The model captures deterministic water use trends driven by long-term changes in water rates and conservation.
- The model controls for the effects of drought-related water use restrictions and COVID-related shelter-in-place orders on average water use.

The model's general specification is:

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + \mu_i + \varepsilon_{it}$$

⁵ A Fourier series takes a periodic signal like monthly water use and describes it as a sum of sine and cosine waves. Mathematically, if $x(t)$ is a periodic function with period T , then it can be expressed as a Fourier series by

$$x(t) = c + \sum_{n=1}^{\infty} a_n \cos\left(2\pi \frac{nt}{T}\right) + \sum_{n=1}^{\infty} b_n \sin\left(2\pi \frac{nt}{T}\right)$$

The coefficients c , a_n , and b_n , can be estimated econometrically. In typical applications, six or fewer harmonics ($n \leq 6$) provide adequate explanation of the signal.

⁶ In other words, the weather variables are demeaned and therefore centered on zero.

where x_{it} is a vector of regressors, μ_i is the customer-specific time invariant effect, and ε_{it} is an idiosyncratic error. The dependent variable, y_{it} , is customer i's water use in period t, expressed in gallons per day.⁷

The customer-specific time-invariant effect, μ_i , is permitted to be correlated with the regressors, x_{it} , while it is assumed that the idiosyncratic error, ε_{it} , is uncorrelated with either μ_i or x_{it} . This allows for a limited form of endogeneity between the regressors and the model's error term. For example, if the model's regressors are correlated with unobserved household characteristics, it is assumed they are correlated only with the time-invariant component of these characteristics as captured by μ_i .

This specification implies that $E(y_{it}|\mu_i, x_{it}) = x'_{it}\beta + \mu_i$, assuming $E(\varepsilon_{it}|\mu_i, x_{it}) = 0$, and therefore the marginal effect of the jth regressor on expected water use is given by:

$$\beta_j = \partial E(y_{it}|\mu_i, x_{it}) / \partial x_{j,it}$$

The advantage of this specification is that consistent estimates of these marginal effects can be obtained, provided the regressors are time varying, even if they are correlated with unobserved customer characteristics, provided these characteristics are time invariant.⁸

The model's regressors include variables that capture the effects of season, weather, long-term conservation, water rates, drought-related water use restrictions, and COVID-related shelter-in-place orders on average water use. The construction of the model's regressors is described next.

Seasonal Specification

Seasonal effects can be specified on the basis of discrete or continuous time. Given monthly water use data, a common discrete-time specification is to include eleven monthly dummy variables in the model where each variable takes the value one if t falls in its corresponding month and zero otherwise. One month, typically January, serves as the base or reference month and the estimated parameters for the eleven monthly dummy variables measure the degree to which average water use in these other months differ from average water use in January.

An alternative approach is to specify the model's seasonal component in continuous time using Fourier series harmonics.

$$Season_t = \sum_{n=1}^6 \beta_{\cos_n} \cos\left(2\pi \frac{nt}{365}\right) + \sum_{n=1}^6 \beta_{\sin_n} \sin\left(2\pi \frac{nt}{365}\right)$$

⁷ Calculated by dividing the customer's metered water use in the billing period expressed in gallons by the number of days in the period.

⁸ For example, the effect of rainfall on expected water use may be correlated with unobserved landscape area or lot size. Provided landscape area and lot size are time invariant, it is still possible to get consistent estimates of the effect of rainfall on expected water use.

The above specification works with daily water use data. When the water use data are monthly, the daily harmonics must be averaged over the number of days in the billing cycle. A 30-day moving average is used to construct the necessary averages which are then matched to the meter read dates for each customer.

There are two advantages to the continuous-time specification compared to the discrete-time specification. The first is the ability to leverage meter read dates to estimate the seasonal pattern of water use more precisely. The second is the ability to possibly drop the higher order harmonics without significant predictive loss and thus have a more parsimonious model and more degrees of freedom with which to estimate the model's coefficients.

Weather Specification

The model's seasonal component captures the effect of average weather on water use whereas its weather component estimates how water use changes when temperature and rainfall are above or below average. This is accomplished by expressing the weather variables as deviations from average.

$$Weather_t = \beta_{Rain} \cdot dRain_t + \beta_{Lag_rain} \cdot dRain_{t-1} + \beta_{Temp} \cdot dTemp_t$$

where $dRain_t$ is the difference between actual rainfall and expected rainfall in period t . The temperature variable is similarly defined. The rainfall and temperature variables are constructed from daily estimates of rainfall (in inches) and maximum air temperature (in degrees Fahrenheit) for the period January 1, 1981, to December 31, 2021, obtained from the Oregon State University PRISM Climate Group website for the latitudes and longitudes shown in Table 14.⁹ The daily estimates are formed into 30-day moving sums in the case of rainfall and 30-day moving averages in the case of temperature. The 30-day sums and averages are then matched to the meter read dates for each customer.

⁹ The weather data were downloaded from <https://prism.oregonstate.edu/explorer/>.

Table 14. PRISM Weather Data Latitude and Longitude

Division	District	Latitude	Longitude
Central	Monterey	37.301	-121.907
Central	Central Satellite		
	Ambler	36.577	-121.726
	Garrapata	36.452	-121.923
	Ralph Lane	36.783	-121.672
	Toro	36.577	-121.726
Central	Chualar	36.567	-121.513
Southern	Baldwin Hills	34.007	-118.376
Southern	Duarte	34.124	-117.986
Southern	San Marino	34.123	-118.116
Southern	San Diego	32.626	-117.078
Southern	Ventura	34.200	-118.833
Northern	Sacramento	38.596	-121.377
Northern	Larkfield	38.506	-122.753
Northern	Meadowbrook	37.301	-120.501
There was insufficient water use data to estimate models for Fruitridge and therefore weather data was not collected for that district.			

Drought Specification

Two drought periods are specified in the model with dummy variables that take the value of one during the drought period and zero otherwise. The first spans 2015 and 2016 when local and state water use restrictions were implemented in response to severe drought and adverse water supply conditions. The second covers the period following Governor Newsom's July 23, 2021, call for a 15 percent voluntary reduction in water use and runs to the end of the estimation period (December 31, 2021).

COVID Specification

The model includes two dummy variables corresponding to the adoption of COVID-related shelter-in-place orders and the widespread rollout of vaccines. The first variable takes the value of one from April 1, 2020, through December 31, 2020, and zero otherwise. Shelter-in-place orders were broadly in place by the third week of March 2020. Meter reads starting April 1 would therefore include at least one to two weeks of water use after these orders had taken effect. The second variable takes the value of one from January 1, 2021, through the end of the estimation period (December 31, 2021), and zero otherwise. Vaccines began to be widely administered in early 2021 and many schools resumed in-class instruction in the second half of 2021. Both factors would be expected to impact residential and commercial water uses. The two COVID variables are designed to capture changes in water use as responses to the pandemic evolved.

Water Rate Specification

The model's price variable is specified as the average price paid by customer i in period t . The average price is calculated as customer i 's commodity charge, inclusive of quantity-based surcharges and surcredits, divided by the number of units purchased. In the case of the non-residential customer classes, this is the same as the posted rate, plus any surcharges and surcredits, since a uniform rate per unit is charged regardless of quantity purchased. This is not the case for the residential customer class (or the multi-residential class in the Monterey District). Residential rates use an increasing-block rate design where the rate paid depends on the amount of water purchased. As a consequence, the residential price variable is not independent of observed purchased quantities and standard regression methods will not yield consistent estimates of the marginal effect of price on water use. A naïve regression approach would likely estimate a positive relationship between price and quantity – i.e., an upward sloping demand curve. But this is merely a consequence of endogeneity between price and water use – the more that is purchased, the higher the price that is paid per unit, and hence it appears as though consumers increase their consumption in response to a higher price, contrary to the law of demand.

To deal with the endogeneity of the residential price variable, an instrumental price variable is constructed, and instrumental variables regression techniques are used to estimate the residential models.¹⁰ Following the guidance in Billings and Jones (2008), the price instrument is the average price paid by the median water user.

Annual Trend

The model includes an annual trend term that captures any longer-term deterministic trend in average water use after controlling for weather, drought, COVID, and rate effects. The model's trend picks up the effect of time-variant unmeasured variables, including passive conservation due to plumbing codes and appliance standards, utility-sponsored conservation, changes in household size and income, and changes in the business environment.

Estimation Results

The average use models are estimated with the statistical software program Stata (Version 17). The non-residential customer class models are estimated using Stata's *xtreg* panel model estimator. The residential models (and the multi-residential model for Monterey District) are estimated with Stata's *xtivreg* estimator since these models utilize price instruments to deal with the endogeneity of residential water rates. Appendix A provides the regression output for each district. A discussion of key model results follows.

¹⁰ If X is the matrix of regressors and Z is the matrix of instruments, then the two-stage least squares (2SLS) estimator $\hat{\beta}_{2SLS} = \{X'Z(Z'Z)^{-1}Z'X\}^{-1}X'Z(Z'Z)^{-1}Z'y$ will yield consistent estimates of β .

Price Elasticity

The sensitivity of water sales to changes in water prices is an important predictor of future water sales, particularly since water rates are expected to continue to escalate in real terms. By the law of demand, it is expected that higher rates will lead to lower water sales. The degree to which sales may be expected to adjust to changing prices is measured by the price elasticity which indicates the expected percentage change in sales given a percentage increase in price. For example, an elasticity of -0.1 indicates that a 10 percent increase in the price of water would be expected to decrease sales by one percent ($10\% \times (-0.1) = -1\%$).

Tables 15 and 16 summarize estimated price elasticities for the Residential and Commercial customer classes. Sample size limitations and extreme heterogeneity of uses prevented reliable estimates of price response within the Public Authority class. In the Residential class, estimated price elasticities range from -0.09 to -0.48, as shown in Table 15. Estimates for the Central Satellite Systems, Chualar, and Meadowbrook, were not statistically significant. The Residential estimates are in line with empirical estimates of residential price elasticity in the published literature (Dalhuisen, et al., 2003).

In the Commercial class, estimated price elasticities, summarized in Table 16, range from -0.03 to -0.39. As in the case of the Residential class, estimates for the Central Satellite Systems, Chualar, and Meadowbrook, were not statistically significant or could not be estimated due to insufficient data.

Table 15. Residential Price Elasticity Estimates by District

District	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey – Single family	-0.315	0.009	-35.350	0.000	-0.333	-0.298
Monterey – Multi family	-0.041	0.035	-1.180	0.237	-0.110	0.027
Central Satellite Systems	N.S.					
Chualar	N.S.					
Baldwin Hills	-0.022	0.016	-1.390	0.166	-0.052	0.009
Duarte	-0.109	0.018	-5.910	0.000	-0.145	-0.073
San Marino	-0.126	0.018	-7.090	0.000	-0.161	-0.091
San Diego	-0.476	0.012	-40.890	0.000	-0.499	-0.454
Ventura	-0.455	0.010	-46.610	0.000	-0.474	-0.436
Sacramento	-0.093	0.009	-10.690	0.000	-0.110	-0.076
Larkfield	-0.343	0.038	-8.940	0.000	-0.418	-0.268
Meadowbrook	N.S.					

N.S. = Not Statistically Significant

Table 16. Commercial Price Elasticity Estimates by District

District	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey	-0.092	0.044	-2.080	0.038	-0.179	-0.005
Central Satellite Systems	N.S.					
Chualar	N.S.					
Baldwin Hills	-0.026	0.100	-0.260	0.798	-0.221	0.170
Duarte	-0.099	0.049	-2.040	0.041	-0.194	-0.004
San Marino	-0.175	0.075	-2.330	0.020	-0.323	-0.028
San Diego	-0.388	0.034	-11.370	0.000	-0.455	-0.321
Ventura	-0.328	0.050	-6.550	0.000	-0.426	-0.230
Sacramento	-0.147	0.024	-6.210	0.000	-0.194	-0.101
Larkfield	-0.360	0.123	-2.930	0.003	-0.601	-0.119
Meadowbrook	N.S.					

Los Angeles includes Baldwin Hills, Duarte, and San Marino districts.
N.S. = Not Statistically Significant

Annual Trend

Negative and statistically significant trends were detected for Ventura’s Residential class and Monterey’s Multi-Residential class. Negative trends were not detected in the other districts. This is not unexpected given the relatively short estimation period and the significant shocks – two droughts, COVID – occurring during it. In Ventura, the trend is approximately three-tenths of a percent per year. In Monterey, the trend is much larger, about 3 percent per year. This could be due to a shift in the composition of multi-family development with denser developments with less outdoor water use coming online and/or the transition from uniform to increasing-block pricing of multi-residential water use that took place during the estimation period.

Weather Sensitivity

Perhaps nothing has a more predictable effect on urban water sales than weather. Due to California’s Mediterranean climate, outdoor landscaping is largely dependent on irrigation. Rainfall can substitute for this irrigation from fall through spring, particularly in the northern half of the state. When rainfall is below average, irrigation water uses predictably increase, and when it is above average, they decrease. Similarly, when temperatures are above average, irrigation demands increase, and when temperatures are below average, they decrease. These effects can be measured with statistical models of monthly water use.

Tables 17 to 19 summarize estimated weather effects for the Residential, Commercial, and Public Authority customer classes. These effects are expressed as semi-elasticities which indicate the percentage change in expected sales given a one unit change in the weather variable.

For rainfall, the semi-elasticity measures the percentage change in expected sales given a one inch deviation from average monthly rainfall. Thus, for example, if January rainfall in Monterey is one inch

below its long-term average, residential sales in January would be predicted to increase by 2.3 percent. There is a lagged effect of rainfall on water sales that can either compound or mitigate the contemporaneous rainfall effect. For example, if December rainfall in Monterey also is one inch below its long-term average, residential sales in January would be predicted to increase by 4.0 percent. However, if December rainfall in Monterey were instead one inch above its long-term average, then residential sales in January would be predicted to increase by only 0.6 percent.

Temperature effects are calculated in a similar fashion. The temperature semi-elasticity measures the percentage change in expected sales given a one degree F deviation from average daily maximum air temperature. Thus, for example, if July average maximum daily air temperature in Monterey is one degree F above average, July residential water sales would be predicted to increase by 1.0 percent. Unlike rainfall, lagged temperature effects are not included in the model. Whereas soil moisture which determines the need for irrigation is strongly influenced by both contemporaneous and past rainfall, this is much less the case with temperature. Contemporaneous temperature is more important than past temperatures for predicting water use.

There is significant heterogeneity in weather sensitivities both across districts and across customer classes. In general, the Southern Division districts' water sales are more sensitive to weather than are the sales in the Central or Northern Divisions. Among the districts in the Southern Division, Ventura stands out as being more sensitive to rainfall than the other districts. Across customer classes, the Public Authority class is the most sensitive to weather, followed by the Residential class. This is in line with the fact that these two classes utilize large amounts of water for weather-dependent irrigation.

Table 17. Residential Weather Semi-Elasticities by District

Rainfall	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	-0.023	0.000	-75.520	0.000	-0.023	-0.022
Monterey – Multi family	-0.010	0.001	-15.51	0.000	-0.011	-0.008
Central Satellite Systems	-0.037	0.003	-13.080	0.000	-0.042	-0.031
Chualar	-0.027	0.005	-5.900	0.000	-0.036	-0.018
Baldwin Hills	-0.031	0.001	-46.140	0.000	-0.032	-0.030
Duarte	-0.030	0.001	-30.960	0.000	-0.032	-0.028
San Marino	-0.031	0.001	-53.340	0.000	-0.032	-0.030
San Diego	-0.030	0.000	-73.090	0.000	-0.030	-0.029
Ventura	-0.057	0.001	-112.540	0.000	-0.058	-0.056
Sacramento	-0.014	0.000	-91.270	0.000	-0.014	-0.014
Larkfield	-0.007	0.000	-19.210	0.000	-0.008	-0.006
Meadowbrook	-0.025	0.001	-17.590	0.000	-0.028	-0.023
Lagged Rainfall	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	-0.017	0.000	-60.000	0.000	-0.017	-0.016
Monterey – Multi family	-0.006	0.001	-11.290	0.000	-0.007	-0.005
Central Satellite Systems	-0.027	0.002	-11.020	0.000	-0.031	-0.022
Chualar	-0.007	0.003	-1.990	0.046	-0.013	0.000
Baldwin Hills	-0.018	0.001	-32.300	0.000	-0.020	-0.017
Duarte	-0.019	0.001	-25.910	0.000	-0.020	-0.018
San Marino	-0.019	0.000	-47.300	0.000	-0.020	-0.019
San Diego	-0.021	0.000	-60.280	0.000	-0.022	-0.021
Ventura	-0.025	0.000	-87.910	0.000	-0.025	-0.024
Sacramento	-0.006	0.000	-39.600	0.000	-0.006	-0.005
Larkfield	-0.006	0.000	-18.530	0.000	-0.007	-0.006
Meadowbrook	-0.017	0.002	-11.370	0.000	-0.020	-0.014
Temperature	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	0.010	0.000	51.560	0.000	0.010	0.010
Monterey – Multi family	0.003	0.000	6.670	0.000	0.002	0.004
Central Satellite Systems	0.010	0.001	7.710	0.000	0.008	0.013
Chualar	0.008	0.003	3.130	0.002	0.003	0.013
Baldwin Hills	0.008	0.000	23.980	0.000	0.007	0.008
Duarte	0.014	0.000	38.530	0.000	0.013	0.014
San Marino	0.013	0.000	58.550	0.000	0.013	0.013
San Diego	0.008	0.000	52.980	0.000	0.008	0.008
Ventura	0.009	0.000	64.580	0.000	0.009	0.010
Sacramento	0.014	0.000	111.220	0.000	0.014	0.014
Larkfield	0.013	0.001	23.440	0.000	0.012	0.014
Meadowbrook	0.012	0.001	15.800	0.000	0.011	0.014

The rainfall semi-elasticity measures the percentage change in expected sales given a one inch deviation in average monthly rainfall. The temperature semi-elasticity measures the percentage change in expected sales given a one degree F deviation in average daily maximum air temperature.

Table 18. Commercial Weather Semi-Elasticities by District

Rainfall	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.020	0.002	-9.890	0.000	-0.023	-0.016
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	-0.015	0.003	-5.090	0.000	-0.020	-0.009
Duarte	-0.017	0.002	-8.940	0.000	-0.021	-0.013
San Marino	-0.010	0.002	-6.380	0.000	-0.013	-0.007
San Diego	-0.034	0.002	-17.450	0.000	-0.038	-0.030
Ventura	-0.071	0.004	-18.120	0.000	-0.079	-0.063
Sacramento	-0.009	0.001	-16.520	0.000	-0.010	-0.008
Larkfield	-0.004	0.001	-4.290	0.000	-0.006	-0.002
Meadowbrook	Insufficient data					
Lagged Rainfall	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.008	0.001	-5.830	0.000	-0.010	-0.005
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	-0.008	0.002	-3.150	0.002	-0.012	-0.003
Duarte	-0.016	0.002	-9.050	0.000	-0.019	-0.012
San Marino	-0.007	0.002	-3.940	0.000	-0.010	-0.003
San Diego	-0.025	0.002	-16.550	0.000	-0.028	-0.022
Ventura	-0.034	0.002	-16.860	0.000	-0.038	-0.030
Sacramento	-0.010	0.001	-16.330	0.000	-0.011	-0.009
Larkfield	-0.006	0.001	-6.250	0.000	-0.008	-0.004
Meadowbrook	Insufficient data					
Temperature	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	0.005	0.001	3.810	0.000	0.002	0.008
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	0.010	0.002	5.510	0.000	0.006	0.013
Duarte	0.006	0.001	8.750	0.000	0.005	0.007
San Marino	0.004	0.001	4.970	0.000	0.002	0.005
San Diego	0.004	0.001	7.140	0.000	0.003	0.005
Ventura	0.007	0.001	7.920	0.000	0.005	0.008
Sacramento	0.007	0.000	17.240	0.000	0.006	0.008
Larkfield	0.005	0.001	3.170	0.002	0.002	0.008
Meadowbrook	Insufficient data					
The rainfall semi-elasticity measures the percentage change in expected sales given a one inch deviation in average monthly rainfall. The temperature semi-elasticity measures the percentage change in expected sales given a one degree F deviation in average daily maximum air temperature.						

Table 19. Public Authority Weather Semi-Elasticities by District

Rainfall	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.023	0.007	-3.120	0.002	-0.037	-0.009
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	-0.060	0.031	-1.930	0.054	-0.121	0.001
Duarte	-0.029	0.007	-3.960	0.000	-0.044	-0.015
San Marino	-0.057	0.011	-4.960	0.000	-0.079	-0.034
San Diego	-0.089	0.016	-5.660	0.000	-0.120	-0.058
Ventura	-0.077	0.019	-3.960	0.000	-0.115	-0.039
Sacramento	-0.026	0.003	-8.070	0.000	-0.032	-0.020
Larkfield	Insufficient data					
Meadowbrook	Insufficient data					
Lagged Rainfall	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.033	0.009	-3.740	0.000	-0.050	-0.016
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	-0.041	0.019	-2.210	0.027	-0.078	-0.005
Duarte	-0.044	0.008	-5.280	0.000	-0.060	-0.028
San Marino	-0.031	0.007	-4.230	0.000	-0.045	-0.017
San Diego	-0.047	0.009	-5.510	0.000	-0.064	-0.031
Ventura	-0.046	0.007	-6.260	0.000	-0.060	-0.031
Sacramento	-0.017	0.003	-5.650	0.000	-0.022	-0.011
Larkfield	Insufficient data					
Meadowbrook	Insufficient data					
Temperature	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	N.S.					
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	0.007	0.003	2.960	0.003	0.002	0.012
San Marino	0.010	0.003	2.870	0.004	0.003	0.016
San Diego	0.028	0.007	4.120	0.000	0.015	0.042
Ventura	0.019	0.005	3.920	0.000	0.009	0.028
Sacramento	0.028	0.004	6.840	0.000	0.020	0.036
Larkfield	Insufficient data					
Meadowbrook	Insufficient data					
The rainfall semi-elasticity measures the percentage change in expected sales given a one inch deviation in average monthly rainfall. The temperature semi-elasticity measures the percentage change in expected sales given a one degree F deviation in average daily maximum air temperature.						
N.S. = Not Statistically Significant						

Weather Sales Risk

The weather semi-elasticities can be used to simulate sales risk due to weather variability. This was done using the last 30 years of monthly rainfall and average maximum daily air temperature for each district. The results are summarized in Table 20. Sales percentiles are reported as a percentage of the baseline sales forecast which is based on the average weather for the model estimation period, January 1, 2014, to December 31, 2021.

The following assumptions were adopted for the simulation:

- Industrial has half the weather sensitivity as Commercial.
- No weather sensitivity for the Other and Sales for Resale classes
- Commercial and Public Authority weather effects for Central Satellite and Chualar assumed to be same as Monterey.
- Public Authority weather effects for Larkfield assumed to be same as Sacramento.
- Commercial weather effects for Meadowbrook assumed to be same as Sacramento.

Using Ventura as an example, Table 20 indicates that total sales could be as low as 88 percent or as high as 104 percent of the baseline forecast simply because of weather variability. It is possible to use the simulation results in Table 20 to construct sales confidence intervals in terms of weather risk. For example, a 90 percent confidence interval for Ventura's total sales would range from 90 to 103 percent of the baseline forecast – i.e., the range between the 5th and 95th percentiles of the simulation results. In other words, with 90 percent confidence, it is expected that Ventura's actual sales may deviate from predicted sales by -10 to +3 percent on the basis of weather variability alone.

An important observation based on the results in Table 20 is that weather sales risk is not symmetric. There is a greater likelihood that weather will result in sales being lower rather than higher than predicted. This is because in wet or very wet years, rainfall substitutes for irrigation. Often it may be the case that irrigation systems are simply turned off during a wet spring or fall. Because of California's Mediterranean climate, the converse effect when the weather is hot and dry is not as great because it is already necessary to irrigate landscape in the summer months regardless of year type. If the summer turns out hotter than normal, this has an effect on water use, but the effect is relatively small due to the fact that most irrigation systems are automated and the tendency of households in particular to overirrigate their landscapes to begin with. This helps to explain why in Ventura the 5th percentile is 10 percent below the baseline forecast while the 95th percentile is only 3 percent above it.

Table 20. Cal Am District Weather Sales Risk

Monterey	Min	P5	P25	P50	P75	P95	Max
Residential	92.7%	95.5%	97.6%	98.3%	99.5%	101.9%	102.6%
Multiresidential	97.0%	98.5%	99.1%	99.5%	99.9%	100.9%	101.0%
Commercial	95.4%	97.4%	98.6%	99.0%	99.8%	101.5%	101.7%
Industrial	97.7%	98.7%	99.3%	99.5%	99.9%	100.7%	100.9%
Public Authority	92.4%	96.1%	98.0%	99.4%	100.9%	101.9%	103.8%
Total	94.1%	96.5%	98.1%	98.8%	99.7%	101.7%	102.2%
Central Satellite	Min	P5	P25	P50	P75	P95	Max
Residential	91.9%	95.7%	97.6%	98.4%	100.1%	102.0%	103.6%
Commercial	95.4%	97.4%	98.6%	99.0%	99.8%	101.5%	101.7%
Public Authority	92.4%	96.1%	98.0%	99.4%	100.9%	101.9%	103.8%
Total	92.4%	95.9%	97.8%	98.5%	100.1%	101.9%	103.3%
Chualar	Min	P5	P25	P50	P75	P95	Max
Residential	95.4%	97.2%	98.1%	98.7%	99.7%	101.0%	101.5%
Commercial	95.4%	97.4%	98.6%	99.0%	99.8%	101.5%	101.7%
Public Authority	92.4%	96.1%	98.0%	99.4%	100.9%	101.9%	103.8%
Total	95.3%	97.2%	98.1%	98.7%	99.7%	101.1%	101.6%
Baldwin Hills	Min	P5	P25	P50	P75	P95	Max
Residential	92.9%	93.7%	96.6%	99.1%	100.0%	101.7%	102.7%
Commercial	96.0%	96.1%	97.6%	98.9%	99.5%	101.4%	102.0%
Industrial	98.0%	98.1%	98.8%	99.4%	99.7%	100.7%	101.0%
Public Authority	90.2%	92.3%	96.2%	99.6%	101.2%	103.5%	104.1%
Total	93.4%	94.1%	96.7%	99.1%	100.0%	101.7%	102.7%
Duarte	Min	P5	P25	P50	P75	P95	Max
Residential	91.2%	93.2%	95.7%	98.4%	101.0%	103.1%	104.6%
Commercial	94.2%	95.7%	97.7%	99.1%	100.6%	101.8%	102.6%
Industrial	97.1%	97.9%	98.8%	99.5%	100.3%	100.9%	101.3%
Public Authority	90.8%	92.8%	96.2%	99.1%	100.8%	103.1%	104.2%
Total	92.1%	94.0%	96.4%	98.7%	100.9%	102.7%	103.9%
San Marino	Min	P5	P25	P50	P75	P95	Max
Residential	90.2%	92.9%	96.2%	98.3%	100.7%	101.8%	103.7%
Commercial	96.5%	97.5%	98.6%	99.6%	100.3%	100.7%	101.2%
Industrial	98.2%	98.7%	99.3%	99.8%	100.1%	100.3%	100.6%
Public Authority	87.8%	90.4%	95.0%	98.7%	101.0%	102.3%	103.9%
Total	91.5%	93.8%	96.7%	98.6%	100.6%	101.6%	103.1%

Table 20 Continued

San Diego	Min	P5	P25	P50	P75	P95	Max
Residential	94.9%	96.4%	98.1%	99.5%	100.3%	101.7%	102.9%
Commercial	95.7%	96.4%	98.3%	99.8%	100.8%	101.2%	102.4%
Industrial	97.9%	98.2%	99.2%	99.9%	100.4%	100.6%	101.2%
Public Authority	84.2%	90.7%	94.0%	98.6%	100.7%	105.2%	108.5%
Total	93.6%	95.5%	97.6%	99.5%	100.6%	102.0%	103.6%
Ventura	Min	P5	P25	P50	P75	P95	Max
Residential	88.4%	90.7%	94.6%	98.5%	100.2%	103.1%	103.4%
Commercial	85.6%	88.1%	93.7%	98.8%	100.8%	103.4%	104.5%
Industrial	92.8%	94.1%	96.9%	99.4%	100.4%	101.7%	102.3%
Public Authority	85.2%	87.6%	93.4%	97.3%	100.1%	102.9%	104.9%
Total	88.0%	90.2%	94.5%	98.6%	100.3%	103.0%	103.7%
Sacramento	Min	P5	P25	P50	P75	P95	Max
Residential	93.3%	94.8%	97.4%	98.4%	99.3%	101.0%	102.4%
Commercial	95.8%	97.1%	98.7%	99.2%	99.7%	100.8%	101.7%
Industrial	97.9%	98.5%	99.4%	99.6%	99.8%	100.4%	100.9%
Public Authority	87.4%	89.9%	94.8%	97.2%	98.9%	101.5%	105.3%
Total	93.7%	95.2%	97.6%	98.5%	99.4%	101.0%	102.4%
Larkfield	Min	P5	P25	P50	P75	P95	Max
Residential	94.9%	95.4%	97.5%	98.8%	99.6%	101.3%	102.5%
Commercial	97.5%	98.0%	99.0%	99.4%	99.9%	100.8%	101.4%
Industrial	98.7%	99.0%	99.5%	99.7%	100.0%	100.4%	100.7%
Public Authority	87.4%	89.9%	94.8%	97.2%	98.9%	101.5%	105.3%
Total	95.8%	96.3%	98.0%	99.0%	99.7%	101.1%	102.1%
Meadowbrook	Min	P5	P25	P50	P75	P95	Max
Residential	93.6%	95.0%	97.1%	98.8%	100.0%	101.2%	102.5%
Commercial	95.8%	97.1%	98.7%	99.2%	99.7%	100.8%	101.7%
Total	94.1%	95.4%	97.5%	98.9%	100.0%	101.1%	102.3%

P# = # percentile sales expressed as a percentage of the baseline forecast. Based on last 30 years of monthly rainfall and average maximum daily air temperature. Industrial class weather sensitivity assumed to be 1/2 that of Commercial class. Weather effects for the Other and Sales for Resale classes not estimated and assumed to be zero for the purposes of this simulation. Commercial and Public Authority weather effects for Central Satellite and Chualar assumed to be same as for Monterey. Public Authority weather effects for Larkfield assumed to be same as Sacramento. Commercial weather effects for Meadowbrook assumed to be same as Sacramento.

ACAM Weather Normalization

In this rate case, Cal Am is requesting retention of the Annual Consumption Adjustment Mechanism (ACAM) pilot program for all its districts and the permanent program in the Monterey District.¹¹ The ACAM annually updates the sales forecast based on differences in forecast and actual sales in the prior year. This allows for more accurate forecasts by incorporating current information on evolving usage patterns and responses to changing conditions. In particular, the ACAM is intended to adjust expected sales in response to 1) known and forecast changes in consumption as the result of drought restrictions, 2) other regulatory imposed production limitations, 3) emergency mandated use reductions, and 4) acceleration or deceleration in secular water use trends not fully captured by the GRC sales forecast.

Using Cal Am's Ventura District as an example, we show in Appendix B that a simple ACAM would have significantly outperformed the GRC sales forecasts over the 12 year period 2010-2021. The mean absolute percentage error (MAPE) over this period for the simple ACAM forecast is 7.6% compared to a MAPE of 13.5% for the GRC sales forecasts. Mainly the forecasting improvement occurs during and immediately after the 2013-2016 drought. The simple ACAM adapts more quickly than the GRC forecasts to the changing sales conditions caused by the drought and its aftermath.

As demonstrated in the previous section, year-to-year variability in weather can be expected to cause actual sales to deviate from forecasted sales. This, however, is an irreducible risk since future weather cannot be reliably forecast more than about 10 days ahead.¹² Additionally, at an annual time-step there is little to no serial correlation in rainfall which is the primary demand driver for irrigation water uses.¹³ Removing the contemporaneous effects of weather on sales before applying the ACAM could therefore be beneficial since next year's weather may be significantly different from this year's. For this reason, we recommend weather normalizing sales using the precipitation and temperature semi-elasticities presented above before calculating the ACAM sales adjustment. This will ensure the adjustment is reflecting changes in sales due to changes in customer usage patterns unrelated to weather. Weather normalization can be applied to all Cal Am districts, but it will be particularly important to weather normalize the Southern Division sales because sales in this division fluctuate the most in response to changes in weather.

In Appendix B we also demonstrate the performance of a weather-adjusted ACAM for Cal Am's Ventura District. The MAPE for the weather-normalized ACAM is 6.7% compared to 7.6% for the simple ACAM and 13.5% for the GRC forecasts. Thus, the weather-normalized ACAM outperforms the simple ACAM

¹¹ D.21-11-024 approved the ACAM as a pilot program for all of California American Water's districts across the state except for the Fruitridge Vista and Chualar districts (pp. 156-157). In this GRC, the Company proposes to apply the ACAM to all districts but exclude Fruitridge Vista and Bass Lake, which will not be fully metered until 2025.

¹² Zhang, F., Sun, Y. Q., Magnusson, L., Buizza, R., Lin, S., Chen, J., & Emanuel, K. (2019). What Is the Predictability Limit of Midlatitude Weather?, *Journal of the Atmospheric Sciences*, 76(4), 1077-1091. Retrieved Apr 26, 2022, from <https://journals.ametsoc.org/view/journals/atasc/76/4/jas-d-18-0269.1.xml>

¹³ <https://californiawaterblog.com/2021/11/28/how-dry-will-2022-be/>

and provides a 50% improvement in forecast accuracy over the GRC sales forecasts for the 12-year period considered.

Drought Response

Water sales are impacted by drought to various degrees. At the start of a drought, it is common for sales to increase as a result of the dryer and hotter conditions. This is a consequence of the sensitivity of water sales to weather discussed in the previous section. If the drought persists, it is likely that restrictions on water use will be imposed on water users. These restrictions may take the form of limits on the number of days in a week that water users can irrigate landscape, prohibitions on certain types of water use, allocations or budgets intended to reduce customer water use by some prescribed amount, and adjustments to water rates or implementation of surcharges to incentivize conservation. During prolonged droughts, urban water use in California typically decreases by ten to thirty percent (Mitchell, et al., 2017).

The average use forecast models included two drought controls – one covering water use restrictions that were implemented in 2015 and 2016 in response to worsening water supply conditions and the state conservation mandate and the other covering Governor Newsom’s July 2021 call for Californians to reduce water use by 15 percent.

Tables 21 and 22 summarize estimated drought responses for these two periods. These responses are expressed as semi-elasticities which indicate the percentage change in expected sales during each drought period. For example, Ventura district’s Residential sales during 2015-2016 were 17 percent lower than would be expected in the absence of drought restrictions. Following Governor Newsom’s July 2021 conservation order, they were 4 percent lower.¹⁴

It should be noted that a statistically significant reduction in average water use while a drought restriction is in place is not a foregone conclusion. For example, no statistically significant reduction in Baldwin Hills Commercial water use was detected in 2015-2016. Moreover, while Residential water use decreased in response to Governor Newsom’s conservation order in every district, responses by Commercial and Public Authority customers were not statistically distinguishable from zero in most districts.

¹⁴ The percentage adjustments in Tables 21 and 22 are relative to what average water use would have been over the estimation period in the absence of the drought restrictions, after controlling for weather, changes in water rates, and long-term trend in water use. This results in a lower percentage decrease than what the state has previously reported as the level of conservation savings that occurred in these districts in response to its conservation mandate. This is because the state measured the change in water use relative to 2013 actual water use. Water use in 2013 was much higher compared to average use over the model estimation period (2014-2021) and consequently the percentage change reported by the state is greater. Additionally, the state’s statistics did not control for weather or price effects or other factors affecting water use. The state ascribed the total change in water use to the conservation mandate. The forecast models, by contrast, control for these other factors and thus measure more accurately the actual effect of the drought restrictions on water use.

Table 21. 2015-2016 Drought Response Semi-Elasticities by District

Residential	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey – Single family	-0.065	0.002	-33.070	0.000	-0.068	-0.061
Monterey – Multi family	-0.032	0.005	-6.690	0.000	-0.042	-0.023
Central Satellite Systems	-0.134	0.014	-9.340	0.000	-0.162	-0.106
Chualar	Insufficient data					
Baldwin Hills	-0.040	0.004	-8.950	0.000	-0.049	-0.031
Duarte	-0.114	0.006	-19.940	0.000	-0.125	-0.103
San Marino	-0.128	0.005	-28.340	0.000	-0.137	-0.119
San Diego	-0.097	0.002	-52.010	0.000	-0.101	-0.093
Ventura	-0.170	0.002	-77.210	0.000	-0.175	-0.166
Sacramento	-0.100	0.002	-60.470	0.000	-0.103	-0.097
Larkfield	-0.096	0.005	-21.200	0.000	-0.105	-0.087
Meadowbrook	Insufficient data					
Commercial	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.045	0.012	-3.850	0.000	-0.068	-0.022
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	-0.062	0.014	-4.310	0.000	-0.090	-0.034
San Marino	-0.066	0.024	-2.690	0.007	-0.114	-0.018
San Diego	-0.045	0.006	-8.130	0.000	-0.056	-0.034
Ventura	-0.110	0.013	-8.450	0.000	-0.136	-0.085
Sacramento	-0.052	0.005	-10.760	0.000	-0.061	-0.042
Larkfield	-0.054	0.014	-3.910	0.000	-0.081	-0.027
Meadowbrook	Insufficient data					
Public Authority	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.037	0.020	-1.790	0.074	-0.077	0.003
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	-0.293	0.074	-3.980	0.000	-0.437	-0.149
San Marino	-0.219	0.076	-2.860	0.004	-0.368	-0.069
San Diego	-0.124	0.053	-2.340	0.019	-0.229	-0.020
Ventura	-0.127	0.038	-3.300	0.001	-0.202	-0.051
Sacramento	-0.217	0.030	-7.190	0.000	-0.276	-0.158
Larkfield	Insufficient data					
Meadowbrook	Insufficient data					
The drought response semi-elasticity measures the percentage change in expected sales over the period of drought restriction.						
N.S. = Not Statistically Significant						

Table 22. 2021 Drought Response Semi-Elasticities by District

Residential	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	-0.021	0.003	-7.110	0.000	-0.026	-0.015
Monterey – Multi family	-0.031	0.007	-4.270	0.000	-0.045	-0.017
Central Satellite Systems	-0.103	0.021	-4.990	0.000	-0.143	-0.062
Chualar	-0.102	0.028	-3.610	0.000	-0.157	-0.047
Baldwin Hills	-0.107	0.007	-16.280	0.000	-0.120	-0.094
Duarte	-0.061	0.007	-8.730	0.000	-0.075	-0.047
San Marino	-0.086	0.004	-19.390	0.000	-0.095	-0.078
San Diego	-0.043	0.002	-18.360	0.000	-0.048	-0.038
Ventura	-0.040	0.003	-13.760	0.000	-0.046	-0.035
Sacramento	-0.091	0.002	-39.440	0.000	-0.096	-0.086
Larkfield	-0.197	0.010	-19.270	0.000	-0.217	-0.177
Meadowbrook	-0.084	0.009	-9.050	0.000	-0.102	-0.066
Commercial	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey	N.S.					
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	N.S.					
San Marino	N.S.					
San Diego	-0.014	0.008	-1.760	0.079	-0.030	0.002
Ventura	N.S.					
Sacramento	-0.032	0.007	-4.280	0.000	-0.046	-0.017
Larkfield	-0.079	0.026	-3.070	0.002	-0.130	-0.029
Meadowbrook	Insufficient data					
Public Authority	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey	N.S.					
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	N.S.					
San Marino	N.S.					
San Diego	N.S.					
Ventura	N.S.					
Sacramento	N.S.					
Larkfield	Insufficient data					
Meadowbrook	Insufficient data					

The drought response semi-elasticity measures the percentage change in expected sales over the period of drought restriction.
N.S. = Not Statistically Significant

Drought Sales Risk

The drought response semi-elasticities can be used to simulate sales risk due to drought water use restrictions. This was done based on the estimated responses to the 2015-2016 and 2021 drought water use restrictions as well as the weighted average of these two responses. The results are summarized in Table 23.

The following assumptions were adopted for the calculation of drought sales risk:

- Weights for the weighted average risk are based on the number of years represented in each drought category – 2/3 for 2015-16 and 1/3 for 2021.
- Industrial has half the drought response as Commercial.
- No drought response for the Other and Sales for Resale classes
- Commercial and Public Authority drought effects for Central Satellite and Chualar assumed to be same as Monterey.
- 2015-16 drought response for Chualar and Meadowbrook Residential assumed to be same as 2021.
- Public Authority drought effects for Larkfield assumed to be same as Sacramento.
- Commercial drought effects for Meadowbrook assumed to be same as Sacramento.

The results are used to estimate the likely reduction in total annual sales should drought water use restrictions be in place in the Test Year. The amount of reduction varies by district and customer class. Overall, total sales are roughly 5 to 10 percent lower than the baseline forecast when looking at the weighted average response, and 5 to 15 percent lower than the baseline forecast when looking at the maximum response.

Table 23. Cal Am District Drought Sales Risk

Monterey	2015-16	2021	Wtd. Avg.
Residential	93.5%	97.9%	95.0%
Multiresidential	96.8%	96.9%	96.8%
Commercial	95.5%	100.0%	97.0%
Industrial	97.7%	100.0%	98.5%
Public Authority	100.0%	100.0%	100.0%
Total	94.9%	98.5%	96.1%
Central Satellite	2015-16	2021	Wtd. Avg.
Residential	86.6%	89.7%	87.6%
Commercial	95.5%	100.0%	97.0%
Public Authority	100.0%	100.0%	100.0%
Total	87.9%	91.2%	89.0%
Chualar	2015-16	2021	Wtd. Avg.
Residential	89.8%	89.8%	89.8%
Commercial	95.5%	100.0%	97.0%
Public Authority	100.0%	100.0%	100.0%
Total	90.4%	90.5%	90.4%
Baldwin Hills	2015-16	2021	Wtd. Avg.
Residential	96.0%	89.3%	93.8%
Commercial	100.0%	100.0%	100.0%
Industrial	100.0%	100.0%	100.0%
Public Authority	100.0%	100.0%	100.0%
Total	96.8%	91.6%	95.1%
Duarte	2015-16	2021	Wtd. Avg.
Residential	88.6%	93.9%	90.4%
Commercial	93.8%	100.0%	95.9%
Industrial	96.9%	100.0%	97.9%
Public Authority	70.7%	100.0%	80.5%
Total	88.9%	96.3%	91.4%
San Marino	2015-16	2021	Wtd. Avg.
Residential	87.2%	91.4%	88.6%
Commercial	93.4%	100.0%	95.6%
Industrial	96.7%	100.0%	97.8%
Public Authority	78.1%	100.0%	85.4%
Total	88.2%	93.5%	90.0%

Table 23 Continued

San Diego	2015-16	2021	Wtd. Avg.
Residential	90.3%	95.7%	92.1%
Commercial	95.5%	98.6%	96.5%
Industrial	97.7%	99.3%	98.2%
Public Authority	87.6%	100.0%	91.7%
Total	91.8%	97.4%	93.7%
Ventura	2015-16	2021	Wtd. Avg.
Residential	83.0%	96.0%	87.3%
Commercial	89.0%	100.0%	92.7%
Industrial	94.5%	100.0%	96.3%
Public Authority	87.3%	100.0%	91.5%
Total	85.7%	97.5%	89.6%
Sacramento	2015-16	2021	Wtd. Avg.
Residential	90.0%	90.9%	90.3%
Commercial	94.8%	96.8%	95.5%
Industrial	97.4%	98.4%	97.7%
Public Authority	78.3%	100.0%	85.5%
Total	90.7%	93.5%	91.6%
Larkfield	2015-16	2021	Wtd. Avg.
Residential	90.4%	80.3%	87.0%
Commercial	94.6%	92.1%	93.8%
Industrial	97.3%	96.0%	96.9%
Public Authority	78.3%	100.0%	85.5%
Total	91.8%	84.5%	89.3%
Meadowbrook	2015-16	2021	Wtd. Avg.
Residential	91.6%	91.6%	91.6%
Commercial	94.8%	96.8%	95.5%
Total	92.2%	92.7%	92.4%

Industrial class drought response assumed to be 1/2 that of Commercial class. Drought response for the Other and Sales for Resale classes not estimated and assumed to be zero for the purposes of this simulation. Commercial and Public Authority drought effects for Central Satellite and Chualar assumed to be same as for Monterey. 2015-16 Chualar Residential drought effect assumed to be same as 2021. Public Authority drought effect for Larkfield assumed to be same as Sacramento. Commercial drought effect for Meadowbrook assumed to be same as Sacramento.

COVID Impact on Sales

The shelter-in-place orders in response to the COVID pandemic have impacted both residential and non-residential water use. Increased residential and decreased commercial water use in response to the shelter-in-place orders have been broadly reported (Department of Water Resources 2021, Pacific Institute 2020). This makes intuitive sense given the shift to remote work and school and the closure of many offices and businesses during the worst waves of the pandemic. Under such conditions, one would expect residential water use to go up and commercial water use to go down.

The model includes two dummy variables corresponding to the adoption of COVID-related shelter-in-place orders and the widespread rollout of vaccines. The first variable takes the value of one from April 1, 2020, through December 31, 2020, and zero otherwise. Shelter-in-place orders were broadly in place by the third week of March 2020. Meter reads starting April 1 would therefore include at least one to two weeks of water use after these orders had taken effect. The second variable takes the value of one from January 1, 2021, through the end of the estimation period (December 31, 2021), and zero otherwise. Vaccines began to be widely administered in early 2021 and many schools resumed in-class instruction in the second half of 2021. Both factors would be expected to impact residential and commercial water uses. The two COVID variables are designed to capture changes in water use as responses to the pandemic evolved.

Tables 24 and 25 summarizes estimated effects of the COVID pandemic on Residential and Commercial water uses. These effects are expressed as semi-elasticities which indicate the percentage change in expected sales during each period covered by the model's COVID variables. Based on the estimation results, the following is noted:

- In the first part of the pandemic, Residential water use increased in every District. The amount of increase ranged from 2 to 13 percent with Monterey, Larkfield, and Ventura registering the largest increases.
- Over the same period, statistically significant decreases in Commercial water use were registered in three districts – Monterey, San Marino, and Ventura. The decrease in Monterey was particularly large, probably due to its tourist-based economy which was severely impacted by the shelter-in-place orders.
- Pandemic effects on Residential water use in 2021 were mixed. Effects were either significantly lessened or had fully dissipated in five districts -- Monterey, San Diego, Ventura, Sacramento, and Larkfield. They were roughly the same or larger in five districts – Central Satellite Systems, Baldwin Hills, Duarte, San Marino, and Meadowbrook. The increase in the three Los Angeles districts may be due to the particular intensity of the Delta and Omicron COVID outbreaks in that region.
- The effects of the pandemic on Commercial water use in 2021 were also mixed. Effects were significantly lessened in Monterey and Ventura but remained roughly the same or increased in Duarte, San Marino, San Diego, Sacramento, and Larkfield.

Table 24. Effect of COVID Pandemic on Residential Water Use

Apr 1-Dec 31 2020	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	0.130	0.003	50.180	0.000	0.125	0.136
Monterey – Multi family	0.086	0.007	12.770	0.000	0.073	0.099
Central Satellite Systems	0.040	0.020	1.980	0.047	0.000	0.080
Chualar	Insufficient data					
Baldwin Hills	0.044	0.005	8.220	0.000	0.033	0.054
Duarte	0.042	0.006	6.850	0.000	0.030	0.054
San Marino	0.043	0.004	11.670	0.000	0.036	0.050
San Diego	0.057	0.002	25.860	0.000	0.053	0.061
Ventura	0.096	0.003	36.960	0.000	0.091	0.101
Sacramento	0.027	0.002	12.180	0.000	0.023	0.032
Larkfield	0.101	0.008	11.990	0.000	0.085	0.118
Meadowbrook	0.023	0.008	2.760	0.006	0.007	0.040
Jan1-Dec 31 2021	coeff.	std. err.	z	P> z 	[95% conf. interval]	
Monterey – Single family	0.095	0.003	33.750	0.000	0.089	0.100
Monterey – Multi family	0.084	0.009	9.430	0.000	0.067	0.102
Central Satellite Systems	0.095	0.021	4.430	0.000	0.053	0.137
Chualar	Insufficient data					
Baldwin Hills	0.075	0.006	12.120	0.000	0.063	0.087
Duarte	0.037	0.006	5.840	0.000	0.025	0.049
San Marino	0.066	0.004	16.980	0.000	0.059	0.074
San Diego	N.S.					
Ventura	0.066	0.003	19.540	0.000	0.059	0.073
Sacramento	-0.010	0.002	-4.810	0.000	-0.014	-0.006
Larkfield	0.015	0.009	1.710	0.088	-0.002	0.033
Meadowbrook	0.037	0.009	4.260	0.000	0.020	0.054
The COVID response semi-elasticity measures the percentage change in expected sales due to COVID shelter-in-place orders.						
N.S. = Not Statistically Significant						

Table 25. Effect of COVID Pandemic on Commercial Water Use

Apr 1-Dec 31 2020	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.358	0.048	-7.440	0.000	-0.452	-0.263
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	N.S.					
San Marino	-0.057	0.023	-2.510	0.012	-0.102	-0.013
San Diego	N.S.					
Ventura	-0.070	0.019	-3.750	0.000	-0.106	-0.033
Sacramento	N.S.					
Larkfield	N.S.					
Meadowbrook	Insufficient data					
Jan1-Dec 31 2021	coeff.	std. err.	z	P> z	[95% conf. interval]	
Monterey	-0.129	0.028	-4.590	0.000	-0.184	-0.074
Central Satellite Systems	Insufficient data					
Chualar	Insufficient data					
Baldwin Hills	N.S.					
Duarte	-0.038	0.019	-1.980	0.048	-0.075	0.000
San Marino	-0.061	0.025	-2.460	0.014	-0.109	-0.012
San Diego	-0.019	0.010	-1.940	0.053	-0.037	0.000
Ventura	N.S.					
Sacramento	-0.045	0.007	-6.200	0.000	-0.059	-0.031
Larkfield	-0.098	0.029	-3.350	0.001	-0.156	-0.041
Meadowbrook	Insufficient data					
The COVID response semi-elasticity measures the percentage change in expected sales due to COVID shelter-in-place orders.						
N.S. = Not Statistically Significant						

COVID Sales Risks

COVID creates significant uncertainty in terms of forecasting future water sales. If the pandemic resolves and work and school return to something closer to pre-pandemic patterns, then Residential water use would be predicted to decrease in most districts. At the same time, Commercial water use would be predicted to increase somewhat. Given the relative sizes of the two user groups, overall water use would likely fall somewhat. On the other hand, if the pandemic continues or worsens, it is likely that Residential use in particular will remain elevated above its pre-pandemic level.

To address this uncertainty, the average sales forecasts presented in the next section assume a balanced 2021 COVID effect, which essentially is half the estimated 2021 effects shown in Tables 24 and 25. This is consistent with a scenario where the pandemic largely resolves, however, some of the increase in remote work persists and thus Residential water use remains somewhat elevated while Commercial use remains somewhat depressed relative to before the pandemic.

Average Sales Forecasts

Based on the foregoing, three average use forecasts for Test Year 2024 are presented:

1. Baseline Forecast
2. Drought Restrictions Forecast
3. Weighted Average Forecast

Baseline Forecast – This forecast assumes a balanced COVID effect which is essentially half of the 2021 COVID effects reported in Tables 24 and 25. As stated above, this is consistent with a scenario where the pandemic largely resolves, however, some of the increase in remote work persists and thus Residential water use remains somewhat elevated while Commercial use remains somewhat depressed relative to before the pandemic. The forecast is based on the average weather for the estimation period. This period was, on average, drier and warmer than the 30-year norms typically used to characterize average weather, as shown in Table 26, and thus incorporates the warmer, drier climate California is now experiencing. The forecast assumes average water prices escalate, in real terms, by two percent annually between now and the Test Year and average water use is adjusted to reflect these higher prices in accordance with the price elasticities presented in Tables 15 and 16. The Baseline Forecast assumes drought restrictions are not in place in the Test Year.

Drought Restrictions Forecast – This forecast provides an estimate of water use assuming drought restrictions are in place in the Test Year. The amount of reduction in average use is based on the average drought effects reported in Table 23 applied to the Baseline Forecast.

Weighted Average Forecast – This forecast averages these two forecasts based on the likelihood drought restrictions are in place in the Test Year. This likelihood is assumed to equal the frequency of critically dry years over the last 30 years. This frequency is 27 percent based on DWR’s Sacramento and San Joaquin River Index Water Year Classifications. Thus, the Weighted Average Forecast assigns a weight of 0.73 to the Baseline Forecast and a weight of 0.27 to the Drought Restrictions Forecast. The Weighted Average Forecast is what a risk-neutral planner would likely put forward while the Drought Restrictions Forecast is what a risk-averse planner would likely advance.

Tables 27 to 37 provide the three forecasts as well as the 5-year, 3-year, and 2021 average use levels for reference.

Table 26. District Weather Averages

District	Avg Monthly Rainfall (Inches)		Avg Maximum Daily Air Temperature (F)	
	2014-2021	30-yr Norm	2014-2021	30-yr Norm
Monterey	1.57	1.74	66.2	65.2
Central Satellite	1.34	1.43	70.1	69.1
Chualar	1.10	1.13	69.8	68.4
Baldwin Hills	1.02	1.23	73.0	71.8
Duarte	1.12	1.42	79.3	78.5
San Marino	1.21	1.57	79.1	78.2
San Diego	0.75	0.80	72.0	71.2
Ventura	1.02	1.30	74.4	73.3
Sacramento	1.70	1.70	76.0	74.6
Larkfield	2.59	2.70	72.1	70.9
Meadowbrook	0.96	1.06	77.0	75.9

Table 27. Monterey Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Monterey	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	59	60	60	56	54	56
Multiresidential	286	280	277	266	258	264
Commercial	343	330	322	340	330	337
Industrial	1,888	1,531	1,568	1,531	1,508	1,525
Public Authority	388	362	371	377	377	377
Other	282	251	187	251	251	251
Sales for Resale	1,709	1,820	1,866	1,820	1,820	1,820

Table 28. Central Satellite Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Central Satellite	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	132	133	131	133	114	128
Multiresidential	0	0	0	0	0	0
Commercial	763	763	759	763	740	757
Industrial	0	0	0	0	0	0
Public Authority	644	626	616	626	626	626
Other	126	133	232	133	133	133
Sales for Resale	0	0	0	0	0	0

Table 29. Chualar Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Chualar	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	192	188	176	188	171	183
Multiresidential	0	0	0	0	0	0
Commercial	197	200	248	200	194	198
Industrial	0	0	0	0	0	0
Public Authority	628	637	489	637	637	637
Other	190	182	80	182	182	182
Sales for Resale	0	0	0	0	0	0

Table 30. Baldwin Hills Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Baldwin Hills	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	157	156	159	161	151	158
Multiresidential	0	0	0	0	0	0
Commercial	339	331	343	342	342	342
Industrial	4,018	2,178	2,111	2,178	2,178	2,178
Public Authority	1,607	1,509	1,729	1,682	1,682	1,682
Other	98	37	35	37	37	37
Sales for Resale	0	0	0	0	0	0

Table 31. Duarte Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Duarte	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	190	193	199	200	181	195
Multiresidential	0	0	0	0	0	0
Commercial	1,117	1,068	1,029	1,032	989	1,020
Industrial	1,042	976	920	976	956	970
Public Authority	1,370	1,344	1,337	1,375	1,106	1,302
Other	708	876	156	876	876	876
Sales for Resale	0	0	0	0	0	0

Table 32. San Marino Test Year 2024 Average Use Forecast (CCF/Meter/Year)

San Marino	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	227	226	231	230	204	223
Multiresidential	0	0	0	0	0	0
Commercial	591	576	563	572	547	565
Industrial	1,031	985	789	985	963	979
Public Authority	1,166	1,226	1,316	1,221	1,043	1,173
Other	206	189	173	189	189	189
Sales for Resale	0	0	0	0	0	0

Table 33. San Diego Test Year 2024 Average Use Forecast (CCF/Meter/Year)

San Diego	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	101	99	99	99	91	97
Multiresidential	0	0	0	0	0	0
Commercial	702	681	699	693	668	686
Industrial	0	0	0	0	0	0
Public Authority	1,923	1,943	2,089	2,108	1,933	2,060
Other	570	311	276	311	311	311
Sales for Resale	0	0	0	0	0	0

Table 34. Ventura Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Ventura	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	188	188	194	185	161	178
Multiresidential	0	0	0	0	0	0
Commercial	1,083	1,080	1,124	1,083	1,004	1,062
Industrial	3,228	3,118	3,086	3,118	3,003	3,087
Public Authority	2,146	2,149	2,463	2,327	2,131	2,274
Other	533	407	366	407	407	407
Sales for Resale	0	0	0	0	0	0

Table 35. Sacramento Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Sacramento	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	131	131	130	133	120	129
Multiresidential	0	0	0	0	0	0
Commercial	726	734	769	756	722	747
Industrial	191,786	167,519	188,376	167,519	163,731	166,496
Public Authority	2,386	2,424	2,522	2,481	2,122	2,384
Other	312	369	524	369	369	369
Sales for Resale	0	0	0	0	0	0

Table 36. Larkfield Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Larkfield	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	106	99	96	101	88	97
Multiresidential	0	0	0	0	0	0
Commercial	360	357	348	370	347	363
Industrial	0	0	0	0	0	0
Public Authority	923	715	482	715	611	687
Other	0	0	0	0	0	0
Sales for Resale	0	0	0	0	0	0

Table 37. Meadowbrook Test Year 2024 Average Use Forecast (CCF/Meter/Year)

Meadowbrook	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	204	204	208	204	198	202
Multiresidential	0	0	0	0	0	0
Commercial	1,479	1,425	1,302	1,425	1,360	1,407
Industrial	0	0	0	0	0	0
Public Authority	0	0	0	0	0	0
Other	0	0	0	0	0	0
Sales for Resale	0	0	0	0	0	0

Total Sales Forecast

The total sales forecast is the product of the service forecasts in Tables 3-13 and the average use forecasts in Tables 27-37. The total sales forecasts for Test Year 2024 are provided in Tables 38-48. The 5-year average, 3-year average, and 2021 sales levels are also provided for reference.

Table 38. Monterey Test Year 2024 Sales Forecast (CCF)

Monterey	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	1,965,564	1,983,798	1,997,128	1,868,217	1,774,909	1,843,024
Multiresidential	494,756	484,948	479,186	462,428	447,740	458,462
Commercial	1,127,706	1,081,129	1,057,887	1,113,790	1,080,331	1,104,756
Industrial	7,551	6,125	6,273	6,125	6,033	6,100
Public Authority	196,173	183,077	187,848	191,148	191,148	191,148
Other	18,949	16,356	13,118	18,031	18,031	18,031
Sales for Resale	3,418	3,640	3,731	3,640	3,640	3,640
Total Sales	3,814,117	3,759,073	3,745,171	3,663,379	3,521,833	3,625,162

Table 39. Central Satellite Test Year 2024 Sales Forecast (CCF)

Central Satellite	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	114,702	115,445	113,761	115,065	99,080	110,749
Multiresidential	0	0	0	0	0	0
Commercial	18,317	18,309	18,219	18,309	17,759	18,160
Industrial	0	0	0	0	0	0
Public Authority	1,288	1,253	1,232	1,253	1,253	1,253
Other	206	189	232	133	133	133
Sales for Resale	0	0	0	0	0	0
Total Sales	134,512	135,195	133,444	134,760	118,224	130,295

Table 40. Chualar Test Year 2024 Sales Forecast (CCF)

Chualar	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	35,189	34,420	32,275	34,196	31,181	33,382
Multiresidential	0	0	0	0	0	0
Commercial	1,181	1,200	1,487	1,200	1,164	1,190
Industrial	0	0	0	0	0	0
Public Authority	1,255	1,273	978	1,273	1,273	1,273
Other	244	182	80	104	104	104
Sales for Resale	0	0	0	0	0	0
Total Sales	37,869	37,075	34,820	36,773	33,722	35,949

Table 41. Baldwin Hills Test Year 2024 Sales Forecast (CCF)

Baldwin Hills	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	878,240	868,903	888,791	898,715	842,665	883,581
Multiresidential	0	0	0	0	0	0
Commercial	203,694	198,400	205,928	204,950	204,950	204,950
Industrial	12,054	6,533	6,332	6,533	6,533	6,533
Public Authority	40,171	37,715	43,234	41,515	41,515	41,515
Other	435	198	208	259	259	259
Sales for Resale	0	0	0	0	0	0
Total Sales	1,134,593	1,111,749	1,144,493	1,151,973	1,095,922	1,136,839

Table 42. Duarte Test Year 2024 Sales Forecast (CCF)

Duarte	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	1,251,045	1,269,275	1,307,624	1,318,686	1,191,549	1,284,359
Multiresidential	0	0	0	0	0	0
Commercial	711,238	682,082	661,487	669,957	642,389	662,514
Industrial	16,667	15,611	14,715	15,611	15,290	15,525
Public Authority	164,451	161,683	159,092	163,426	131,516	154,811
Other	4,425	5,246	1,247	6,915	6,915	6,915
Sales for Resale	0	0	0	0	0	0
Total Sales	2,147,825	2,133,898	2,144,165	2,174,597	1,987,659	2,124,124

Table 43. San Marino Test Year 2024 Sales Forecast (CCF)

San Marino	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	2,864,269	2,844,130	2,916,277	2,931,075	2,596,690	2,840,791
Multiresidential	0	0	0	0	0	0
Commercial	835,409	814,923	798,674	816,736	780,870	807,052
Industrial	43,363	42,252	34,698	42,282	41,354	42,031
Public Authority	155,953	161,386	172,448	154,513	131,999	148,434
Other	4,037	3,846	3,639	5,175	5,175	5,175
Sales for Resale	0	0	0	0	0	0
Total Sales	3,903,032	3,866,537	3,925,736	3,949,781	3,556,088	3,843,484

Table 44. San Diego Test Year 2024 Sales Forecast (CCF)

San Diego	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	1,900,041	1,871,813	1,864,050	1,898,232	1,748,234	1,857,732
Multiresidential	0	0	0	0	0	0
Commercial	1,522,931	1,479,385	1,522,807	1,513,929	1,460,939	1,499,622
Industrial	0	0	0	0	0	0
Public Authority	588,372	586,109	632,936	617,831	566,571	603,991
Other	13,220	8,731	7,440	9,905	9,905	9,905
Sales for Resale	0	0	0	0	0	0
Total Sales	4,024,563	3,946,038	4,027,233	4,039,897	3,785,649	3,971,250

Table 45. Ventura Test Year 2024 Sales Forecast (CCF)

Ventura	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	3,633,964	3,637,379	3,758,562	3,574,779	3,120,806	3,452,206
Multiresidential	0	0	0	0	0	0
Commercial	1,232,770	1,231,143	1,281,756	1,248,445	1,156,859	1,223,717
Industrial	566,912	547,634	546,188	569,850	548,948	564,206
Public Authority	412,409	412,699	472,947	444,607	407,004	434,454
Other	3,372	2,303	1,462	800	800	800
Sales for Resale	0	0	0	0	0	0
Total Sales	5,849,426	5,831,159	6,060,915	5,838,480	5,234,417	5,675,383

Table 46. Sacramento Test Year 2024 Sales Forecast (CCF)

Sacramento	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	7,052,776	7,099,401	7,083,446	7,482,474	6,757,457	7,286,720
Multiresidential	0	0	0	0	0	0
Commercial	3,566,388	3,617,571	3,803,867	3,773,931	3,603,249	3,727,847
Industrial	191,786	167,519	188,376	167,519	163,731	166,496
Public Authority	838,281	851,519	885,213	865,797	740,616	831,998
Other	4,898	5,905	8,392	6,142	6,142	6,142
Sales for Resale	0	0	0	0	0	0
Total Sales	11,654,129	11,741,914	11,969,294	12,295,862	11,271,195	12,019,202

Table 47. Larkfield Test Year 2024 Sales Forecast (CCF)

Larkfield	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	189,534	192,698	190,965	213,767	186,028	206,278
Multiresidential	0	0	0	0	0	0
Commercial	114,702	115,216	113,231	120,874	113,342	118,840
Industrial	0	0	0	0	0	0
Public Authority	2,770	2,144	1,446	2,144	1,834	2,060
Other	0	0	0	0	0	0
Sales for Resale	0	0	0	0	0	0
Total Sales	307,007	310,058	305,642	336,785	301,204	327,178

Table 48. Meadowbrook Test Year 2024 Sales Forecast (CCF)

Meadowbrook	5-Yr Avg	3-Yr Avg	2021	Baseline Forecast	Drought Restricted	Weighted Average
Residential	337,284	337,559	344,014	338,731	329,230	336,166
Multiresidential	0	0	0	0	0	0
Commercial	86,081	82,993	78,112	87,608	83,646	86,538
Industrial	0	0	0	0	0	0
Public Authority	0	0	0	0	0	0
Other	0	0	0	0	0	0
Sales for Resale	0	0	0	0	0	0
Total Sales	423,365	420,552	422,126	426,340	412,876	422,704

References

Dalhuisen, Jasper M., et al. 2003. Price and income elasticities of residential water demand: A meta analysis. *Land Economics* 79 (May): 292-308.

Billings, R. Bruce and Clive V. Jones. 2008. Forecasting Urban Water Demand, 2nd Edition. American Water Works Association. Denver.

California Department of Water Resources. 2021. Public Review Draft Report to the Legislature on Results of the Indoor Residential Water Use Study. May 2021.

M.Cubed. 2019. California American Water Sales Forecast: 2019 General Rate Case. April 2019.

Mitchell, D., et al. 2017. Building Drought Resilience in California's Cities and Suburbs. Public Policy Institute of California.

Pacific Institute. 2020. Water and the COVID-19 Pandemic: Impacts on Municipal Water Demand. July 2020.

Appendix A – Regression Model Output

This appendix contains the regression output for the average water use models. The following variable naming conventions are used:

gpd	Dependent variable, average water use expressed in gallons per day
sin1-sin6	Seasonal Fourier sine harmonics
cos1-cos6	Seasonal Fourier cosine harmonics
dppt_ms30	30-day moving sum of demeaned rainfall
dppt_ms30_lag1	1-month lag of 30-day moving sum of demeaned rainfall
dtmax_ma30	30-day moving average of demeaned maximum daily air temperature
drght1516	Drought dummy variable equal to 1 if year is 2015 or 2016, zero otherwise
drght21	Drought dummy variable equal to 1 if t > July 22, 2021, zero otherwise
covid	COVID dummy variable equal to 1 if t > March 31, 2020, zero otherwise
price	Average water price (residential price is instrumented)
year	Annual trend
_cons	Model constant

Monterey District

Residential Class Model

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 3,193,799
Number of groups = 34,520

R-squared:

Within = .
Between = 0.8236
Overall = 0.0508

Obs per group:

min = 1
avg = 92.5
max = 97

corr(u_i, Xb) = -0.2639

Wald chi2(20) = 30315.37
Prob > chi2 = 0.0000

(Std. err. adjusted for 34,520 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-20.06851	.5677241	-35.35	0.000	-21.18122	-18.95579
1.covid20	16.37206	.3434662	47.67	0.000	15.69888	17.04524
1.covid21	11.68487	.358518	32.59	0.000	10.98219	12.38755
sin1	-11.67231	.1562431	-74.71	0.000	-11.97854	-11.36608
cos1	-20.97541	.2425278	-86.49	0.000	-21.45076	-20.50007
sin2	-.3244631	.0580247	-5.59	0.000	-.4381895	-.2107367
cos2	.5636836	.0574455	9.81	0.000	.4510926	.6762747
sin3	1.960892	.0573466	34.19	0.000	1.848494	2.073289
cos3	.4191073	.0483688	8.66	0.000	.3243062	.5139085
sin4	-.248647	.0471435	-5.27	0.000	-.3410465	-.1562474
cos4	-.3004417	.0493093	-6.09	0.000	-.3970862	-.2037971
sin5	-.2846359	.0514587	-5.53	0.000	-.3854931	-.1837787
cos5	.1979814	.0499496	3.96	0.000	.100082	.2958807
sin6	-.834004	.0689224	-12.10	0.000	-.9690894	-.6989185
cos6	1.541327	.0485761	31.73	0.000	1.44612	1.636535
dppt_ms30	-2.708241	.035861	-75.52	0.000	-2.778527	-2.637955
dppt_ms30_lag1	-1.999597	.0333278	-60.00	0.000	-2.064919	-1.934276
dtmax_ma30	1.199706	.023266	51.56	0.000	1.154105	1.245306
1.drght1516	-7.572101	.2251976	-33.62	0.000	-8.01348	-7.130722
1.drght21	-2.425368	.3382266	-7.17	0.000	-3.08828	-1.762456
_cons	153.2798	1.039937	147.39	0.000	151.2416	155.3181
sigma_u	95.198567					
sigma_e	80.990068					
rho	.58012261	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21 sin1 cos1 sin2 cos2 sin3 cos3 sin4 cos4 sin5 cos5 sin6 cos6
dppt_ms30 dppt_ms30_lag1 dtmax_ma30 1.drght1516 1.drght21 price_mu

Multi-Residential Class Model

Fixed-effects (within) IV regression
 Group variable: premise

Number of obs = 158,923
 Number of groups = 1,758

R-squared:
 Within = 0.0303
 Between = 0.1851
 Overall = 0.0048

Obs per group:
 min = 3
 avg = 90.4
 max = 97

corr(u_i, Xb) = -0.0493

Wald chi2(21) = 1098.42
 Prob > chi2 = 0.0000

(Std. err. adjusted for 1,758 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-2.06005	1.432404	-1.44	0.150	-4.867511	.7474101
1.covid20	6.549208	.5306147	12.34	0.000	5.509222	7.589194
1.covid21	6.388813	.6983955	9.15	0.000	5.019983	7.757643
year	-2.209104	.1488554	-14.84	0.000	-2.500855	-1.917353
sin1	-2.263628	.1705359	-13.27	0.000	-2.597872	-1.929383
cos1	-5.290841	.2270747	-23.30	0.000	-5.735899	-4.845783
sin2	.2423809	.0852131	2.84	0.004	.0753664	.4093955
cos2	-.1791733	.0879814	-2.04	0.042	-.3516138	-.0067329
sin3	.4534582	.0763981	5.94	0.000	.3037206	.6031958
cos3	.117545	.0691755	1.70	0.089	-.0180365	.2531266
sin4	-.0098544	.06677	-0.15	0.883	-.1407212	.1210123
cos4	-.2857967	.0741428	-3.85	0.000	-.431114	-.1404794
sin5	.1108298	.0742613	1.49	0.136	-.0347197	.2563792
cos5	.0243765	.0713113	0.34	0.732	-.115391	.164144
sin6	-.5130879	.1111925	-4.61	0.000	-.7310211	-.2951546
cos6	.2635949	.0631032	4.18	0.000	.139915	.3872748
dppt_ms30	-.7230953	.0450594	-16.05	0.000	-.8114102	-.6347805
dppt_ms30_lag1	-.454255	.0392252	-11.58	0.000	-.531135	-.3773749
dtmax_ma30	.1877755	.0296764	6.33	0.000	.1296108	.2459402
1.drght1516	-2.336545	.3463418	-6.75	0.000	-3.015363	-1.657728
1.drght21	-2.244359	.5181284	-4.33	0.000	-3.259872	-1.228846
_cons	4533.024	300.5391	15.08	0.000	3943.978	5122.07
sigma_u	36.413167					
sigma_e	26.668834					
rho	.65087093	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
 year sin1 cos1 sin2
 cos2 sin3 cos3 sin4
 cos4 sin5 cos5 sin6
 cos6 dppt_ms30
 dppt_ms30_lag1
 dtmax_ma30
 1.drght1516
 1.drght21 price_mu

Commercial Class Model

Fixed-effects (within) IV regression
 Group variable: premise

Number of obs = 295,203
 Number of groups = 3,263

R-squared:
 Within = 0.0152
 Between = 0.0018
 Overall = 0.0027

Obs per group:
 min = 1
 avg = 90.5
 max = 97

corr(u_i, Xb) = 0.0065
 Wald chi2(19) = 1815.05
 Prob > chi2 = 0.0000

(Std. err. adjusted for 3,263 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-21.32931	10.1138	-2.11	0.035	-41.15199	-1.506625
1.covid20	-195.3566	21.77584	-8.97	0.000	-238.0364	-152.6767
1.covid21	-77.55051	15.90974	-4.87	0.000	-108.733	-46.368
sin1	-61.01622	4.687909	-13.02	0.000	-70.20436	-51.82809
cos1	-121.1839	8.43226	-14.37	0.000	-137.7109	-104.657
sin2	5.408481	2.598426	2.08	0.037	.3156593	10.5013
cos2	-9.086058	3.368199	-2.70	0.007	-15.68761	-2.484509
sin3	-3.910059	1.806445	-2.16	0.030	-7.450627	-.3694912
cos3	-12.76071	1.763405	-7.24	0.000	-16.21693	-9.304504
sin4	6.17032	2.247274	2.75	0.006	1.765744	10.5749
cos4	5.369141	1.945076	2.76	0.006	1.556862	9.181419
sin5	-.3858599	1.887078	-0.20	0.838	-4.084465	3.312746
cos5	1.895702	1.342951	1.41	0.158	-.7364341	4.527837
sin6	-7.559734	2.563997	-2.95	0.003	-12.58508	-2.534392
cos6	-2.337161	1.418821	-1.65	0.100	-5.117999	.4436772
dppt_ms30	-12.38582	1.214351	-10.20	0.000	-14.7659	-10.00574
dppt_ms30_lag1	-4.854693	.8277779	-5.86	0.000	-6.477108	-3.232278
dtmax_ma30	3.19479	.8311145	3.84	0.000	1.565835	4.823744
1.drght1516	-28.09377	7.161228	-3.92	0.000	-42.12951	-14.05802
_cons	735.6483	25.4339	28.92	0.000	685.7988	785.4979
sigma_u	2179.7029					
sigma_e	860.58934					
rho	.86513985	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
 sin1 cos1 sin2 cos2
 sin3 cos3 sin4 cos4
 sin5 cos5 sin6 cos6
 dppt_ms30
 dppt_ms30_lag1
 dtmax_ma30
 1.drght1516 price_mu

Public Authority Class Model

Fixed-effects (within) regression
 Group variable: premise

Number of obs = 48,390
 Number of groups = 538

R-squared:

Within = 0.0099
 Between = 0.0011
 Overall = 0.0049

Obs per group:

min = 3
 avg = 89.9
 max = 96

corr(u_i, Xb) = 0.0011

F(11,537) = 5.13
 Prob > F = 0.0000

(Std. err. adjusted for 538 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-176.2201	32.4197	-5.44	0.000	-239.9051	-112.5351
cos1	-345.5275	87.53668	-3.95	0.000	-517.4838	-173.5712
sin2	11.71404	14.28155	0.82	0.412	-16.3405	39.76859
cos2	-15.62128	10.61692	-1.47	0.142	-36.47707	5.234507
sin3	40.30128	15.95776	2.53	0.012	8.954	71.64855
cos3	-10.0789	7.70942	-1.31	0.192	-25.22322	5.065417
dppt_ms30	-19.10276	6.125723	-3.12	0.002	-31.13608	-7.06944
dppt_ms30_lag1	-27.57135	7.375845	-3.74	0.000	-42.06039	-13.0823
dtmax_ma30	-1.521338	3.466609	-0.44	0.661	-8.331116	5.28844
1.drght1516	28.38143	90.76183	0.31	0.755	-149.9103	206.6732
1.drght21	-88.31115	95.07015	-0.93	0.353	-275.0661	98.44385
_cons	821.3557	20.57481	39.92	0.000	780.9387	861.7727
sigma_u	2796.2507					
sigma_e	2716.2683					
rho	.51450618	(fraction of variance due to u_i)				

Central Satellite Districts

Residential Customer Class

Fixed-effects (within) regression	Number of obs	=	75,723
Group variable: premise	Number of groups	=	812
R-squared:	Obs per group:		
Within = 0.1272	min =		30
Between = 0.0010	avg =		93.3
Overall = 0.0587	max =		97
	F(20,811)	=	23.00
corr(u_i, Xb) = 0.0005	Prob > F	=	0.0000

(Std. err. adjusted for 812 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
1.covid20	10.30251	5.320918	1.94	0.053	-.1418841	20.7469
1.covid21	24.57767	5.75384	4.27	0.000	13.28349	35.87184
year	-5.914978	1.223481	-4.83	0.000	-8.316541	-3.513415
sin1	-56.10075	3.449135	-16.27	0.000	-62.87103	-49.33046
cos1	-102.361	5.505522	-18.59	0.000	-113.1677	-91.55424
sin2	.8337991	1.091666	0.76	0.445	-1.309025	2.976623
cos2	6.186921	.8863643	6.98	0.000	4.447082	7.92676
sin3	11.13449	1.025633	10.86	0.000	9.121283	13.1477
cos3	3.362992	.7904612	4.25	0.000	1.811401	4.914583
sin4	3.227486	.7453018	4.33	0.000	1.764538	4.690434
cos4	-1.590042	.7827988	-2.03	0.043	-3.126593	-.0534918
sin5	-2.649985	.8572872	-3.09	0.002	-4.332748	-.9672212
cos5	4.565449	.8605873	5.31	0.000	2.876208	6.25469
sin6	.0146992	1.359626	0.01	0.991	-2.654102	2.6835
cos6	4.180886	5.940715	0.70	0.482	-7.480104	15.84188
dppt_ms30	-9.18412	.6106019	-15.04	0.000	-10.38267	-7.985573
dppt_ms30_lag1	-6.345865	.5161353	-12.29	0.000	-7.358983	-5.332746
dtmax_ma30	2.844808	.3293806	8.64	0.000	2.198269	3.491347
1.drght1516	-32.58846	3.166276	-10.29	0.000	-38.80352	-26.3734
1.drght21	-33.58834	4.473914	-7.51	0.000	-42.37016	-24.80652
_cons	12212.65	2468.15	4.95	0.000	7367.931	17057.36
sigma_u	251.31666					
sigma_e	218.45169					
rho	.56961921	(fraction of variance due to u_i)				

Chualar District**Residential Customer Class**

Fixed-effects (within) regression	Number of obs	=	7,664
Group variable: premise	Number of groups	=	172
R-squared:			
Within = 0.2180	Obs per group:	min =	1
Between = 0.0595		avg =	44.6
Overall = 0.0763		max =	48
F(16,171) = 17.70			
corr(u_i, Xb) = -0.0125	Prob > F	=	0.0000

(Std. err. adjusted for 172 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-24.215	2.918574	-8.30	0.000	-29.97607	-18.45392
cos1	-71.66374	4.701473	-15.24	0.000	-80.94413	-62.38334
sin2	-4.264316	1.477445	-2.89	0.004	-7.180695	-1.347937
cos2	-6.19327	1.654755	-3.74	0.000	-9.459648	-2.926892
sin3	6.658917	1.653466	4.03	0.000	3.395084	9.92275
cos3	-1.620067	1.420535	-1.14	0.256	-4.424108	1.183975
sin4	.1633994	1.377759	0.12	0.906	-2.556205	2.883004
cos4	-4.064528	1.308043	-3.11	0.002	-6.646518	-1.482537
sin5	-9.510834	1.924644	-4.94	0.000	-13.30995	-5.711713
cos5	-7.695325	1.706289	-4.51	0.000	-11.06343	-4.327223
sin6	5.204989	5.665207	0.92	0.360	-5.977755	16.38773
cos6	-15.98365	9.187659	-1.74	0.084	-34.11948	2.152185
dppt_ms30	-8.119557	1.361278	-5.96	0.000	-10.80663	-5.432484
dppt_ms30_lag1	-2.00032	1.002136	-2.00	0.048	-3.978471	-.0221694
dtmax_ma30	2.451864	.7813035	3.14	0.002	.9096221	3.994105
1.drght21	-29.67372	7.872643	-3.77	0.000	-45.2138	-14.13364
_cons	312.4068	1.351287	231.19	0.000	309.7394	315.0741
sigma_u	161.84746					
sigma_e	102.2253					
rho	.71482815	(fraction of variance due to u_i)				

Baldwin Hills**Residential Customer Class**

Fixed-effects (within) IV regression Number of obs = 501,682
 Group variable: premise Number of groups = 5,624

R-squared: Obs per group:
 Within = 0.0618 min = 6
 Between = 0.1854 avg = 89.2
 Overall = 0.0299 max = 96

corr(u_i, Xb) = -0.0086 Wald chi2(20) = 1.13e+07
 Prob > chi2 = 0.0000

(Std. err. adjusted for 5,624 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-10.51225	7.580923	-1.39	0.166	-25.37058	4.34609
1.covid20	14.18021	1.755057	8.08	0.000	10.74036	17.62006
1.covid21	24.30798	2.060098	11.80	0.000	20.27027	28.3457
sin1	-41.08461	.5992147	-68.56	0.000	-42.25905	-39.91017
cos1	-47.72626	.7373748	-64.72	0.000	-49.17148	-46.28103
sin2	-1.691444	.336563	-5.03	0.000	-2.351095	-1.031793
cos2	-8.307394	.3401929	-24.42	0.000	-8.974159	-7.640628
sin3	-4.900416	.2898477	-16.91	0.000	-5.468507	-4.332325
cos3	15.46321	.3093994	49.98	0.000	14.8568	16.06963
sin4	7.134768	.2849403	25.04	0.000	6.576295	7.69324
cos4	-10.32692	.2977305	-34.69	0.000	-10.91046	-9.743377
sin5	-4.305226	.295882	-14.55	0.000	-4.885144	-3.725308
cos5	4.706693	.29448	15.98	0.000	4.129523	5.283863
sin6	3.492513	.4158135	8.40	0.000	2.677534	4.307493
cos6	-3.227869	.2784009	-11.59	0.000	-3.773525	-2.682213
dppt_ms30	-9.848926	.2134631	-46.14	0.000	-10.26731	-9.430546
dppt_ms30_lag1	-5.858732	.1814031	-32.30	0.000	-6.214275	-5.503188
dtmax_ma30	2.470913	.1030471	23.98	0.000	2.268944	2.672881
1.drght1516	-12.59415	1.393691	-9.04	0.000	-15.32573	-9.862561
1.drght21	-32.34679	1.893103	-17.09	0.000	-36.0572	-28.63637
_cons	317.6483	4.830297	65.76	0.000	308.1811	327.1155
sigma_u	183.77567					
sigma_e	181.35968					
rho	.50661643	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
 sin1 cos1 sin2 cos2
 sin3 cos3 sin4 cos4
 sin5 cos5 sin6 cos6
 dppt_ms30
 dppt_ms30_lag1
 dtmax_ma30
 1.drght1516
 1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
 Group variable: premise

Number of obs = 53,690
 Number of groups = 611

R-squared:
 Within = 0.0089
 Between = 0.0000
 Overall = 0.0016

Obs per group:
 min = 13
 avg = 87.9
 max = 96

F(18,610) = 8.95
 Prob > F = 0.0000

corr(u_i, Xb) = 0.0002

(Std. err. adjusted for 611 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-22.78657	88.92548	-0.26	0.798	-197.4238	151.8507
1.covid20	-17.45933	22.56757	-0.77	0.439	-61.7789	26.86024
1.covid21	18.08948	26.79493	0.68	0.500	-34.53203	70.71099
sin1	-43.0072	6.411996	-6.71	0.000	-55.59947	-30.41494
cos1	-39.94895	8.766451	-4.56	0.000	-57.16503	-22.73286
sin2	-10.96755	3.062153	-3.58	0.000	-16.98119	-4.953909
cos2	-29.00942	3.432242	-8.45	0.000	-35.74986	-22.26897
sin3	4.591144	2.445977	1.88	0.061	-.212414	9.394701
cos3	30.03155	3.548584	8.46	0.000	23.06263	37.00048
sin4	2.094018	2.446066	0.86	0.392	-2.709714	6.89775
cos4	-16.47347	2.651738	-6.21	0.000	-21.68111	-11.26583
sin5	2.558679	1.974232	1.30	0.195	-1.318438	6.435796
cos5	5.194942	2.620595	1.98	0.048	.0484593	10.34143
sin6	-9.422879	4.487196	-2.10	0.036	-18.23511	-.6106517
cos6	-4.688964	4.062242	-1.15	0.249	-12.66664	3.288712
dppt_ms30	-10.05848	1.965534	-5.12	0.000	-13.91851	-6.198443
dppt_ms30_lag1	-5.275756	1.672355	-3.15	0.002	-8.560027	-1.991485
dtmax_ma30	6.620042	1.194592	5.54	0.000	4.274029	8.966054
_cons	697.1213	68.28536	10.21	0.000	563.0184	831.2243
sigma_u	1236.1763					
sigma_e	592.10527					
rho	.81338968	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 2,282
Number of groups = 27

R-squared:

Within = 0.0622
Between = 0.0179
Overall = 0.0207

Obs per group:

min = 9
avg = 84.5
max = 91

corr(u_i, Xb) = 0.0011

F(9,26) = 3.09
Prob > F = 0.0118

(Std. err. adjusted for 27 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-879.9239	381.305	-2.31	0.029	-1663.708	-96.14023
cos1	-1276.57	837.0921	-1.53	0.139	-2997.238	444.0973
sin2	43.71979	107.6948	0.41	0.688	-177.65	265.0896
cos2	-182.4908	49.37154	-3.70	0.001	-283.9755	-81.00616
dppt_ms30	-187.9472	97.44513	-1.93	0.065	-388.2485	12.35418
dppt_ms30_lag1	-129.5631	58.73474	-2.21	0.036	-250.2941	-8.832091
dtmax_ma30	35.69487	30.58255	1.17	0.254	-27.16847	98.55821
1.drght1516	-405.2302	314.0358	-1.29	0.208	-1050.74	240.2795
1.drght21	238.5746	279.4234	0.85	0.401	-335.7885	812.9376
_cons	3093.157	19.10643	161.89	0.000	3053.884	3132.431
sigma_u	6447.8089					
sigma_e	4426.2091					
rho	.67970006	(fraction of variance due to u_i)				

Duarte District**Residential Customer Class**

Fixed-effects (within) IV regression Number of obs = 616,041
 Group variable: premise Number of groups = 6,634

R-squared: Obs per group:
 Within = 0.0514 min = 1
 Between = 0.2993 avg = 92.9
 Overall = 0.0143 max = 97

corr(u_i, Xb) = -0.0250 Wald chi2(20) = 3567.50
 Prob > chi2 = 0.0000

(Std. err. adjusted for 6,634 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-74.65391	12.63034	-5.91	0.000	-99.40892	-49.89889
1.covid20	15.30779	2.486616	6.16	0.000	10.43412	20.18147
1.covid21	13.33747	2.314295	5.76	0.000	8.801532	17.8734
sin1	-63.30649	1.639123	-38.62	0.000	-66.51911	-60.09386
cos1	-92.7521	2.400656	-38.64	0.000	-97.4573	-88.0469
sin2	5.88009	.4861904	12.09	0.000	4.927175	6.833006
cos2	1.287829	.7472878	1.72	0.085	-.1768279	2.752487
sin3	-2.524793	.5568772	-4.53	0.000	-3.616252	-1.433334
cos3	5.93607	.6444247	9.21	0.000	4.673021	7.199119
sin4	6.801121	.589457	11.54	0.000	5.645807	7.956436
cos4	-2.088404	.4907486	-4.26	0.000	-3.050254	-1.126555
sin5	.4829176	.5111695	0.94	0.345	-.5189561	1.484791
cos5	-6.45361	.5401697	-11.95	0.000	-7.512323	-5.394896
sin6	-3.066237	.4600589	-6.66	0.000	-3.967936	-2.164539
cos6	4.821482	.526668	9.15	0.000	3.789231	5.853732
dppt_ms30	-10.85102	.3505255	-30.96	0.000	-11.53804	-10.164
dppt_ms30_lag1	-6.773164	.261378	-25.91	0.000	-7.285456	-6.260873
dtmax_ma30	4.894221	.1270082	38.53	0.000	4.64529	5.143153
1.drght1516	-39.57142	1.926443	-20.54	0.000	-43.34718	-35.79566
1.drght21	-21.14173	2.357425	-8.97	0.000	-25.7622	-16.52126
_cons	393.4431	6.630401	59.34	0.000	380.4478	406.4385
sigma_u	528.6366					
sigma_e	315.3066					
rho	.73759611	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21 sin1 cos1
 sin2 cos2 sin3 cos3 sin4 cos4
 sin5 cos5 sin6 cos6 dppt_ms30
 dppt_ms30_lag1 dtmax_ma30
 1.drght1516 1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 46,497
Number of groups = 591

R-squared:

Within = 0.0448
Between = 0.0933
Overall = 0.0050

Obs per group:

min = 1
avg = 78.7
max = 97

corr(u_i, Xb) = -0.0418

F(20,590) = 13.95
Prob > F = 0.0000

(Std. err. adjusted for 591 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-129.5366	63.31403	-2.05	0.041	-253.885	-5.188332
1.covid20	-11.15241	13.38123	-0.83	0.405	-37.43304	15.12823
1.covid21	-28.92181	14.42577	-2.00	0.045	-57.25392	-.5897074
sin1	-74.49625	5.1086	-14.58	0.000	-84.5295	-64.463
cos1	-89.17965	6.484688	-13.75	0.000	-101.9155	-76.44376
sin2	-8.035347	2.713155	-2.96	0.003	-13.36396	-2.70673
cos2	-11.16762	2.478793	-4.51	0.000	-16.03595	-6.299283
sin3	5.524885	1.87594	2.95	0.003	1.840553	9.209218
cos3	9.192093	2.139954	4.30	0.000	4.989238	13.39495
sin4	8.162915	1.826242	4.47	0.000	4.576189	11.74964
cos4	-9.018202	1.936226	-4.66	0.000	-12.82094	-5.215468
sin5	.3443314	2.066973	0.17	0.868	-3.715188	4.403851
cos5	-3.395883	1.861101	-1.82	0.069	-7.051073	.2593066
sin6	-4.755189	2.30983	-2.06	0.040	-9.291679	-.2186989
cos6	.2626114	2.400629	0.11	0.913	-4.452207	4.977429
dppt_ms30	-13.37607	1.544493	-8.66	0.000	-16.40944	-10.34269
dppt_ms30_lag1	-12.17586	1.331828	-9.14	0.000	-14.79156	-9.560155
dtmax_ma30	4.719367	.536713	8.79	0.000	3.665266	5.773467
1.drght1516	-47.11992	10.73095	-4.39	0.000	-68.19543	-26.04442
1.drght21	-8.716958	11.82444	-0.74	0.461	-31.94007	14.50616
_cons	869.0841	38.29349	22.70	0.000	793.8759	944.2922
sigma_u	794.37503					
sigma_e	386.39863					
rho	.80866706	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 11,637
Number of groups = 131

R-squared:

Within = 0.1082
Between = 0.0099
Overall = 0.0449

Obs per group:

min = 3
avg = 88.8
max = 96

corr(u_i, Xb) = 0.0022

F(7,130) = 6.92
Prob > F = 0.0000

(Std. err. adjusted for 131 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-997.43	165.3257	-6.03	0.000	-1324.507	-670.3528
cos1	-1287.617	205.6479	-6.26	0.000	-1694.467	-880.767
dppt_ms30	-77.00188	19.42779	-3.96	0.000	-115.4374	-38.56632
dppt_ms30_lag1	-115.2788	21.82205	-5.28	0.000	-158.4511	-72.1065
dtmax_ma30	19.48516	6.592922	2.96	0.004	6.441855	32.52847
1.drght1516	-712.4386	164.4813	-4.33	0.000	-1037.845	-387.032
1.drght21	-266.0855	179.5831	-1.48	0.141	-621.3691	89.19807
_cons	2738.208	32.31519	84.73	0.000	2674.276	2802.14
sigma_u	4101.8004					
sigma_e	3271.9823					
rho	.6111289	(fraction of variance due to u_i)				

San Marino District

Residential Customer Class

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 1,150,178
Number of groups = 12,700

R-squared:

Within = 0.0717
Between = 0.6088
Overall = 0.0110

Obs per group:

min = 3
avg = 90.6
max = 97

corr(u_i, Xb) = -0.0720

Wald chi2(20) = 2.55e+07
Prob > chi2 = 0.0000

(Std. err. adjusted for 12,700 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-125.899	17.76542	-7.09	0.000	-160.7185	-91.07937
1.covid20	20.31584	1.771431	11.47	0.000	16.8439	23.78778
1.covid21	31.56943	1.904329	16.58	0.000	27.83701	35.30184
sin1	-89.96573	1.259166	-71.45	0.000	-92.43365	-87.49781
cos1	-113.5036	1.806592	-62.83	0.000	-117.0445	-109.9628
sin2	-2.869888	.38447	-7.46	0.000	-3.623435	-2.116341
cos2	-8.059863	.4119302	-19.57	0.000	-8.867232	-7.252495
sin3	-1.080011	.3371087	-3.20	0.001	-1.740732	-.4192899
cos3	17.46915	.3458705	50.51	0.000	16.79126	18.14705
sin4	10.24494	.3699235	27.69	0.000	9.519902	10.96998
cos4	-11.77565	.344878	-34.14	0.000	-12.4516	-11.0997
sin5	1.90137	.308739	6.16	0.000	1.296253	2.506487
cos5	-2.897627	.3076645	-9.42	0.000	-3.500639	-2.294616
sin6	1.122563	.4425965	2.54	0.011	.25509	1.990036
cos6	-.0035119	.4005086	-0.01	0.993	-.7884944	.7814705
dppt_ms30	-14.45498	.2709753	-53.34	0.000	-14.98608	-13.92388
dppt_ms30_lag1	-9.002976	.1903562	-47.30	0.000	-9.376068	-8.629885
dtmax_ma30	6.036267	.1031032	58.55	0.000	5.834188	6.238345
1.drght1516	-57.71976	1.97103	-29.28	0.000	-61.5829	-53.85661
1.drght21	-38.69745	1.919061	-20.16	0.000	-42.45874	-34.93616
_cons	516.7291	8.482542	60.92	0.000	500.1036	533.3545
sigma_u	506.66425					
sigma_e	311.90294					
rho	.72518189	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21 sin1 cos1
sin2 cos2 sin3 cos3 sin4 cos4
sin5 cos5 sin6 cos6 dppt_ms30
dppt_ms30_lag1 dtmax_ma30
1.drght1516 1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 115,504
Number of groups = 1,434

R-squared:

Within = 0.0085
Between = 0.0001
Overall = 0.0013

Obs per group:

min = 1
avg = 80.5
max = 85

corr(u_i, Xb) = -0.0005

F(20,1433) = 6.52
Prob > F = 0.0000

(Std. err. adjusted for 1,434 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-388.0055	166.3782	-2.33	0.020	-714.3765	-61.63458
1.covid20	-68.72571	26.69668	-2.57	0.010	-121.0945	-16.35694
1.covid21	-72.87027	28.92256	-2.52	0.012	-129.6054	-16.13518
sin1	-92.38974	11.70577	-7.89	0.000	-115.352	-69.42746
cos1	-119.0732	17.79358	-6.69	0.000	-153.9774	-84.16889
sin2	6.615285	3.613451	1.83	0.067	-.4729357	13.70351
cos2	-4.264801	3.504779	-1.22	0.224	-11.13985	2.610247
sin3	.3235049	2.635417	0.12	0.902	-4.846184	5.493193
cos3	5.732696	4.59631	1.25	0.213	-3.283521	14.74891
sin4	12.66211	3.926776	3.22	0.001	4.959263	20.36495
cos4	-7.184526	3.36183	-2.14	0.033	-13.77916	-.589891
sin5	-7.748246	4.197419	-1.85	0.065	-15.98199	.4854982
cos5	-12.43354	3.714885	-3.35	0.001	-19.72074	-5.146346
sin6	-4.437589	5.332615	-0.83	0.405	-14.89816	6.022981
cos6	9.891566	4.26697	2.32	0.021	1.521388	18.26174
dppt_ms30	-11.83217	1.839718	-6.43	0.000	-15.441	-8.223345
dppt_ms30_lag1	-8.341027	2.112427	-3.95	0.000	-12.48481	-4.197247
dtmax_ma30	4.408171	.8817976	5.00	0.000	2.678418	6.137923
1.drght1516	-79.75266	29.07655	-2.74	0.006	-136.7898	-22.71549
1.drght21	.6926193	22.39429	0.03	0.975	-43.23649	44.62172
_cons	1483.182	98.659	15.03	0.000	1289.651	1676.714
sigma_u	2614.361					
sigma_e	1123.849					
rho	.84402951	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 12,610
Number of groups = 139

R-squared:

Within = 0.0571
Between = 0.0218
Overall = 0.0237

Obs per group:

min = 23
avg = 90.7
max = 97

corr(u_i, Xb) = 0.0041

F(11,138) = 5.84
Prob > F = 0.0000

(Std. err. adjusted for 139 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-638.2773	95.15551	-6.71	0.000	-826.4286	-450.126
cos1	-995.9539	189.8302	-5.25	0.000	-1371.306	-620.602
sin2	-27.69811	27.46126	-1.01	0.315	-81.99735	26.60113
cos2	-96.75607	44.32374	-2.18	0.031	-184.3975	-9.114586
sin3	32.17847	29.83564	1.08	0.283	-26.81565	91.17259
cos3	80.47674	33.17261	2.43	0.017	14.88441	146.0691
dppt_ms30	-129.4902	26.08584	-4.96	0.000	-181.0698	-77.91059
dppt_ms30_lag1	-70.73286	16.73535	-4.23	0.000	-103.8237	-37.642
dtmax_ma30	21.80499	7.58792	2.87	0.005	6.801371	36.80861
1.drght1516	-473.5188	156.2426	-3.03	0.003	-782.4579	-164.5798
1.drght21	317.2438	270.9501	1.17	0.244	-218.5069	852.9944
_cons	2279.612	51.86891	43.95	0.000	2177.051	2382.173
sigma_u	4395.8455					
sigma_e	3473.9733					
rho	.61555459	(fraction of variance due to u_i)				

San Diego District

Residential Customer Class

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 1,630,396
Number of groups = 18,093

R-squared:

Within = 0.0172
Between = 0.5278
Overall = 0.0005

Obs per group:

min = 1
avg = 90.1
max = 97

corr(u_i, Xb) = -0.1169

Wald chi2(20) = 16201.30
Prob > chi2 = 0.0000

(Std. err. adjusted for 18,093 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-101.2861	2.476955	-40.89	0.000	-106.1408	-96.43134
1.covid20	11.32466	.4480893	25.27	0.000	10.44643	12.2029
1.covid21	.2144916	.5080781	0.42	0.673	-.7813232	1.210306
sin1	-9.763802	.1383424	-70.58	0.000	-10.03495	-9.492656
cos1	-23.30744	.2097393	-111.13	0.000	-23.71852	-22.89635
sin2	-.495524	.0805089	-6.15	0.000	-.6533185	-.3377295
cos2	1.636629	.0803793	20.36	0.000	1.479088	1.794169
sin3	.0811808	.0668154	1.22	0.224	-.049775	.2121366
cos3	1.630939	.0653941	24.94	0.000	1.502769	1.759109
sin4	1.992295	.063591	31.33	0.000	1.867659	2.116931
cos4	-.5971962	.0668897	-8.93	0.000	-.7282976	-.4660949
sin5	.8046509	.0680575	11.82	0.000	.6712606	.9380411
cos5	-1.656872	.0689304	-24.04	0.000	-1.791973	-1.521771
sin6	-.3520964	.0883466	-3.99	0.000	-.5252526	-.1789403
cos6	1.302622	.0697493	18.68	0.000	1.165916	1.439328
dppt_ms30	-5.762404	.0788348	-73.09	0.000	-5.916917	-5.60789
dppt_ms30_lag1	-4.137297	.0686309	-60.28	0.000	-4.271811	-4.002782
dtmax_ma30	1.556199	.0293722	52.98	0.000	1.498631	1.613768
1.drght1516	-18.1253	.3379031	-53.64	0.000	-18.78757	-17.46302
1.drght21	-8.108739	.4328746	-18.73	0.000	-8.957158	-7.26032
_cons	288.4645	2.281399	126.44	0.000	283.9931	292.936
sigma_u	94.475041					
sigma_e	76.772521					
rho	.60228086	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
sin1 cos1 sin2 cos2
sin3 cos3 sin4 cos4
sin5 cos5 sin6 cos6
dppt_ms30
dppt_ms30_lag1
dtmax_ma30
1.drght1516
1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 156,677
Number of groups = 1,896

R-squared:

Within = 0.0517
Between = 0.0772
Overall = 0.0066

Obs per group:

min = 1
avg = 82.6
max = 97

corr(u_i, Xb) = -0.0336

F(20,1895) = 38.59
Prob > F = 0.0000

(Std. err. adjusted for 1,896 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-241.3406	21.08988	-11.44	0.000	-282.7024	-199.9788
1.covid20	-8.110933	5.55705	-1.46	0.145	-19.00951	2.787646
1.covid21	-11.39001	5.844017	-1.95	0.051	-22.85139	.0713745
sin1	-39.27093	1.91443	-20.51	0.000	-43.02554	-35.51632
cos1	-71.32892	3.332814	-21.40	0.000	-77.86529	-64.79255
sin2	-6.617587	1.180029	-5.61	0.000	-8.93188	-4.303294
cos2	-3.793754	1.049325	-3.62	0.000	-5.851708	-1.7358
sin3	.2051089	.86837	0.24	0.813	-1.497953	1.908171
cos3	-2.999525	.7876648	-3.81	0.000	-4.544307	-1.454744
sin4	7.399173	.7668943	9.65	0.000	5.895127	8.903219
cos4	-5.858009	.805683	-7.27	0.000	-7.438127	-4.27789
sin5	2.010105	.8078901	2.49	0.013	.4256574	3.594553
cos5	-6.343968	.7969717	-7.96	0.000	-7.907002	-4.780934
sin6	-1.386393	.9179297	-1.51	0.131	-3.186652	.4138657
cos6	-1.464355	1.017609	-1.44	0.150	-3.460108	.5313967
dppt_ms30	-21.08123	1.191611	-17.69	0.000	-23.41824	-18.74422
dppt_ms30_lag1	-15.41086	.9212309	-16.73	0.000	-17.2176	-13.60413
dtmax_ma30	2.559165	.3575715	7.16	0.000	1.85789	3.26044
1.drght1516	-27.72785	3.362661	-8.25	0.000	-34.32276	-21.13295
1.drght21	-8.809399	4.986533	-1.77	0.077	-18.58907	.9702732
_cons	871.1793	21.14294	41.20	0.000	829.7134	912.6452
sigma_u	615.73075					
sigma_e	275.9727					
rho	.83271823	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 29,702
Number of groups = 328

R-squared:

Within = 0.0489
Between = 0.0009
Overall = 0.0153

Obs per group:

min = 1
avg = 90.6
max = 97

corr(u_i, Xb) = 0.0008

F(9,327) = 5.64
Prob > F = 0.0000

(Std. err. adjusted for 328 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-670.2721	98.46074	-6.81	0.000	-863.9685	-476.5757
cos1	-1866.391	366.2463	-5.10	0.000	-2586.887	-1145.894
sin2	-88.87678	34.95767	-2.54	0.011	-157.6471	-20.10648
cos2	-124.2398	37.27044	-3.33	0.001	-197.5599	-50.91968
dppt_ms30	-337.8625	59.68986	-5.66	0.000	-455.2871	-220.438
dppt_ms30_lag1	-179.1424	32.48713	-5.51	0.000	-243.0526	-115.2323
dtmax_ma30	106.6737	25.87191	4.12	0.000	55.77727	157.5701
1.drght1516	-455.8407	188.6681	-2.42	0.016	-826.9972	-84.68428
1.drght21	432.6072	160.5323	2.69	0.007	116.8007	748.4136
_cons	3728.533	40.42893	92.22	0.000	3649	3808.067
sigma_u	9446.6035					
sigma_e	6287.6582					
rho	.69298955	(fraction of variance due to u_i)				

Ventura District**Residential Customer Class**

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 1,846,130
Number of groups = 19,413

R-squared:

Within = 0.0848
Between = 0.9015
Overall = 0.0044

Obs per group:

min = 1
avg = 95.1
max = 98

corr(u_i, Xb) = -0.1620

Wald chi2(21) = 20273.14
Prob > chi2 = 0.0000

(Std. err. adjusted for 19,413 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-240.1003	5.151111	-46.61	0.000	-250.1963	-230.0043
1.covid20	38.45105	1.081	35.57	0.000	36.33233	40.56978
1.covid21	26.05194	1.366198	19.07	0.000	23.37424	28.72964
year	-1.094153	.3580069	-3.06	0.002	-1.795833	-.3924722
sin1	-60.17877	.5250138	-114.62	0.000	-61.20778	-59.14977
cos1	-108.7542	.8532682	-127.46	0.000	-110.4266	-107.0818
sin2	-12.82782	.2162582	-59.32	0.000	-13.25168	-12.40396
cos2	-.2027416	.1838833	-1.10	0.270	-.5631463	.1576632
sin3	2.53687	.1640643	15.46	0.000	2.21531	2.85843
cos3	10.97047	.1757092	62.44	0.000	10.62609	11.31486
sin4	5.946275	.1583366	37.55	0.000	5.635941	6.256609
cos4	-2.478332	.1589	-15.60	0.000	-2.78977	-2.166894
sin5	1.573334	.1601759	9.82	0.000	1.259395	1.887273
cos5	-6.27699	.1678144	-37.40	0.000	-6.6059	-5.94808
sin6	.5898657	.1973567	2.99	0.003	.2030537	.9766776
cos6	3.054428	.1655152	18.45	0.000	2.730024	3.378831
dppt_ms30	-21.87266	.1943476	-112.54	0.000	-22.25357	-21.49174
dppt_ms30_lag1	-9.449038	.1074883	-87.91	0.000	-9.659711	-9.238365
dtmax_ma30	3.609439	.0558942	64.58	0.000	3.499888	3.718989
1.drgh1516	-62.75313	.7757682	-80.89	0.000	-64.27361	-61.23265
1.drgh21	-15.28242	1.090423	-14.02	0.000	-17.41961	-13.14523
_cons	2762.491	719.8822	3.84	0.000	1351.547	4173.434
sigma_u	299.86478					
sigma_e	205.70084					
rho	.6800096	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
year sin1 cos1 sin2
cos2 sin3 cos3 sin4
cos4 sin5 cos5 sin6
cos6 dppt_ms30
dppt_ms30_lag1
dtmax_ma30
1.drgh1516
1.drgh21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 82,833
Number of groups = 1,065

R-squared:

Within = 0.0984
Between = 0.2141
Overall = 0.0132

Obs per group:

min = 1
avg = 77.8
max = 97

corr(u_i, Xb) = -0.0862

F(20,1064) = 32.90
Prob > F = 0.0000

(Std. err. adjusted for 1,065 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-362.6268	54.44768	-6.66	0.000	-469.4638	-255.7898
1.covid20	-63.03897	16.33477	-3.86	0.000	-95.091	-30.98693
1.covid21	-25.06657	15.42267	-1.63	0.104	-55.32888	5.195726
sin1	-136.8848	6.628843	-20.65	0.000	-149.8919	-123.8777
cos1	-206.8458	10.33804	-20.01	0.000	-227.1311	-186.5606
sin2	-55.36737	3.687384	-15.02	0.000	-62.60274	-48.132
cos2	-34.41354	3.59775	-9.57	0.000	-41.47303	-27.35405
sin3	1.046672	2.361757	0.44	0.658	-3.587557	5.680901
cos3	7.772924	2.374958	3.27	0.001	3.112792	12.43306
sin4	6.976525	2.232191	3.13	0.002	2.596529	11.35652
cos4	-17.46883	2.256525	-7.74	0.000	-21.89657	-13.04108
sin5	.0098545	2.555659	0.00	0.997	-5.00485	5.024559
cos5	-24.03218	2.60713	-9.22	0.000	-29.14788	-18.91648
sin6	10.19946	3.573383	2.85	0.004	3.187782	17.21114
cos6	2.529554	2.093529	1.21	0.227	-1.57836	6.637469
dppt_ms30	-66.24346	3.230787	-20.50	0.000	-72.5829	-59.90402
dppt_ms30_lag1	-31.65087	1.714749	-18.46	0.000	-35.01554	-28.28619
dtmax_ma30	6.223652	.7653588	8.13	0.000	4.721868	7.725435
1.drght1516	-99.00561	10.96846	-9.03	0.000	-120.5279	-77.48333
1.drght21	12.85255	14.00791	0.92	0.359	-14.6337	40.33881
_cons	1295.093	45.07453	28.73	0.000	1206.648	1383.538
sigma_u	1025.3642					
sigma_e	584.48629					
rho	.75475577	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 18,430
Number of groups = 195

R-squared:

Within = 0.0436
Between = 0.0001
Overall = 0.0146

Obs per group:

min = 9
avg = 94.5
max = 96

corr(u_i, Xb) = -0.0002

F(9,194) = 10.55
Prob > F = 0.0000

(Std. err. adjusted for 195 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-1149.278	325.2218	-3.53	0.001	-1790.702	-507.8537
cos1	-2506.908	671.1216	-3.74	0.000	-3830.539	-1183.276
sin2	-13.90818	77.73681	-0.18	0.858	-167.226	139.4096
cos2	-119.2666	33.60876	-3.55	0.000	-185.5521	-52.98117
dppt_ms30	-352.066	89.01044	-3.96	0.000	-527.6184	-176.5136
dppt_ms30_lag1	-208.1823	33.26692	-6.26	0.000	-273.7936	-142.571
dtmax_ma30	84.61616	21.6109	3.92	0.000	41.99368	127.2386
1.drght1516	-560.8158	164.5454	-3.41	0.001	-885.3433	-236.2883
1.drght21	488.2569	239.6649	2.04	0.043	15.57363	960.9401
_cons	4384.245	79.03898	55.47	0.000	4228.359	4540.131
sigma_u	12850.971					
sigma_e	9022.2498					
rho	.66983773	(fraction of variance due to u_i)				

Sacramento District

Residential Customer Class

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 5,177,477
Number of groups = 56,750

R-squared:

Within = 0.1665
Between = 0.0889
Overall = 0.0974

Obs per group:

min = 1
avg = 91.2
max = 98

corr(u_i, Xb) = -0.0146

Wald chi2(20) = 4.94e+07
Prob > chi2 = 0.0000

(Std. err. adjusted for 56,750 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-46.44093	4.343077	-10.69	0.000	-54.95321	-37.92866
1.covid20	7.170081	.594979	12.05	0.000	6.003943	8.336218
1.covid21	-2.660706	.5505286	-4.83	0.000	-3.739722	-1.58169
sin1	-46.17694	.2510035	-183.97	0.000	-46.6689	-45.68498
cos1	-103.096	.4759246	-216.62	0.000	-104.0288	-102.1632
sin2	10.95895	.1078569	101.61	0.000	10.74756	11.17035
cos2	12.14057	.107977	112.44	0.000	11.92894	12.3522
sin3	6.811158	.0861474	79.06	0.000	6.642312	6.980004
cos3	-2.411576	.075708	-31.85	0.000	-2.559961	-2.263191
sin4	-.9047771	.0738665	-12.25	0.000	-1.049553	-.7600013
cos4	.8794633	.0739673	11.89	0.000	.7344902	1.024436
sin5	-2.17569	.0792527	-27.45	0.000	-2.331023	-2.020358
cos5	.8170765	.0757202	10.79	0.000	.6686676	.9654854
sin6	1.466481	.1006233	14.57	0.000	1.269263	1.663699
cos6	2.867623	.0920044	31.17	0.000	2.687298	3.047949
dppt_ms30	-3.662948	.0401351	-91.27	0.000	-3.741612	-3.584285
dppt_ms30_lag1	-1.460784	.0368852	-39.60	0.000	-1.533078	-1.38849
dtmax_ma30	3.591965	.0322967	111.22	0.000	3.528665	3.655266
1.drght1516	-25.29013	.4071523	-62.11	0.000	-26.08813	-24.49213
1.drght21	-22.72015	.5528444	-41.10	0.000	-23.80371	-21.6366
_cons	286.3071	2.297533	124.62	0.000	281.804	290.8102
sigma_u	165.24804					
sigma_e	175.08464					
rho	.47112123	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
sin1 cos1 sin2 cos2
sin3 cos3 sin4 cos4
sin5 cos5 sin6 cos6
dppt_ms30
dppt_ms30_lag1
dtmax_ma30
1.drght1516
1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 370,169
Number of groups = 4,620

R-squared:

Within = 0.0790
Between = 0.0382
Overall = 0.0237

Obs per group:

min = 1
avg = 80.1
max = 97

corr(u_i, Xb) = -0.0398

F(20,4619) = 133.57
Prob > F = 0.0000

(Std. err. adjusted for 4,620 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-158.1295	25.43479	-6.22	0.000	-207.9939	-108.2652
1.covid20	1.513942	3.969864	0.38	0.703	-6.268888	9.296772
1.covid21	-25.29146	4.005316	-6.31	0.000	-33.14379	-17.43913
sin1	-62.32992	1.634147	-38.14	0.000	-65.53363	-59.12621
cos1	-122.3717	2.537982	-48.22	0.000	-127.3474	-117.3961
sin2	-4.416259	.9612399	-4.59	0.000	-6.300749	-2.53177
cos2	-10.84921	1.083036	-10.02	0.000	-12.97248	-8.725944
sin3	11.41232	.7755023	14.72	0.000	9.891966	12.93268
cos3	-9.0788	.6434956	-14.11	0.000	-10.34036	-7.817241
sin4	6.632499	.6785909	9.77	0.000	5.302137	7.962862
cos4	-4.628784	.6112298	-7.57	0.000	-5.827087	-3.430482
sin5	-1.302293	.6584006	-1.98	0.048	-2.593073	-.0115131
cos5	1.323754	.6407827	2.07	0.039	.0675137	2.579994
sin6	-.0302117	.7088861	-0.04	0.966	-1.419967	1.359544
cos6	4.874809	.7372448	6.61	0.000	3.429457	6.320161
dppt_ms30	-5.198266	.3124055	-16.64	0.000	-5.810731	-4.585802
dppt_ms30_lag1	-5.576336	.3385034	-16.47	0.000	-6.239965	-4.912708
dtmax_ma30	4.131386	.2379626	17.36	0.000	3.664865	4.597906
1.drght1516	-29.31345	2.683364	-10.92	0.000	-34.57412	-24.05277
1.drght21	-17.90605	4.124151	-4.34	0.000	-25.99135	-9.820743
_cons	683.1033	13.84815	49.33	0.000	655.9543	710.2522
sigma_u	476.95883					
sigma_e	327.36403					
rho	.67976994	(fraction of variance due to u_i)				

Public Authority Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 34,126
Number of groups = 371

R-squared:

Within = 0.1535
Between = 0.0060
Overall = 0.0809

Obs per group:

min = 2
avg = 92.0
max = 96

corr(u_i, Xb) = 0.0025

F(9,370) = 17.14
Prob > F = 0.0000

(Std. err. adjusted for 371 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sin1	-2139.476	189.5677	-11.29	0.000	-2512.241	-1766.71
cos1	-4277.003	444.6857	-9.62	0.000	-5151.432	-3402.575
sin2	630.197	68.23513	9.24	0.000	496.0197	764.3743
cos2	283.3333	71.42428	3.97	0.000	142.8849	423.7818
dppt_ms30	-119.1473	14.75779	-8.07	0.000	-148.167	-90.12768
dppt_ms30_lag1	-76.10994	13.46734	-5.65	0.000	-102.5921	-49.62781
dtmax_ma30	129.3748	18.92251	6.84	0.000	92.16569	166.584
1.drght1516	-939.8377	123.1065	-7.63	0.000	-1181.914	-697.7614
1.drght21	-290.4398	198.4017	-1.46	0.144	-680.5762	99.69664
_cons	4639.866	31.92427	145.34	0.000	4577.09	4702.642
sigma_u	8207.0396					
sigma_e	7917.3246					
rho	.51796173	(fraction of variance due to u_i)				

Larkfield District**Residential Customer Class**

Fixed-effects (within) IV regression
Group variable: premise

Number of obs = 165,950
Number of groups = 1,950

R-squared:

Within = 0.2067
Between = 0.2637
Overall = 0.1087

Obs per group:

min = 1
avg = 85.1
max = 97

corr(u_i, Xb) = -0.0673

Wald chi2(21) = 4812.61
Prob > chi2 = 0.0000

(Std. err. adjusted for 1,950 clusters in premise)

gpd	Coefficient	Robust std. err.	z	P> z	[95% conf. interval]	
price	-55.18497	6.17557	-8.94	0.000	-67.28887	-43.08108
1.covid20	19.18419	1.666229	11.51	0.000	15.91844	22.44994
1.covid21	2.791583	1.645094	1.70	0.090	-.4327432	6.015908
sin1	-27.46476	.6519965	-42.12	0.000	-28.74265	-26.18687
cos1	-60.39595	1.141027	-52.93	0.000	-62.63232	-58.15957
sin2	2.27542	.2729233	8.34	0.000	1.7405	2.81034
cos2	4.652659	.3151682	14.76	0.000	4.03494	5.270377
sin3	6.479985	.278352	23.28	0.000	5.934425	7.025545
cos3	.9502694	.2313366	4.11	0.000	.4968581	1.403681
sin4	-.6325807	.2354376	-2.69	0.007	-1.09403	-.1711316
cos4	-1.541935	.2149168	-7.17	0.000	-1.963164	-1.120706
sin5	-2.132394	.2931305	-7.27	0.000	-2.70692	-1.557869
cos5	-.0595956	.3012522	-0.20	0.843	-.650039	.5308479
sin6	2.515289	.4502829	5.59	0.000	1.632751	3.397827
cos6	11.57479	2.878036	4.02	0.000	5.933941	17.21564
dppt_ms30	-1.300599	.0676946	-19.21	0.000	-1.433278	-1.167919
dppt_ms30_lag1	-1.170915	.0631982	-18.53	0.000	-1.294781	-1.047049
dtmax_ma30	2.419221	.103203	23.44	0.000	2.216946	2.621495
1.tubbsfire	-11.79346	1.310565	-9.00	0.000	-14.36212	-9.224797
1.drght1516	-17.1039	.7881825	-21.70	0.000	-18.64871	-15.55909
1.drght21	-32.83151	1.555884	-21.10	0.000	-35.88099	-29.78203
_cons	249.889	7.148592	34.96	0.000	235.878	263.9
sigma_u	73.752042					
sigma_e	84.215469					
rho	.4340515	(fraction of variance due to u_i)				

Instrumented: price

Instruments: 1.covid20 1.covid21
sin1 cos1 sin2 cos2
sin3 cos3 sin4 cos4
sin5 cos5 sin6 cos6
dppt_ms30
dppt_ms30_lag1
dtmax_ma30
1.tubbsfire
1.drght1516
1.drght21 price_mu

Commercial Customer Class

Fixed-effects (within) regression
Group variable: premise

Number of obs = 26,164
Number of groups = 327

R-squared:

Within = 0.0565
Between = 0.0429
Overall = 0.0119

Obs per group:

min = 1
avg = 80.0
max = 97

corr(u_i, Xb) = -0.0240

F(21,326) = 7.99
Prob > F = 0.0000

(Std. err. adjusted for 327 clusters in premise)

gpd	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
price	-99.50007	33.94283	-2.93	0.004	-166.2747	-32.72544
1.covid20	-8.969994	8.768735	-1.02	0.307	-26.22044	8.280454
1.covid21	-32.25663	9.276641	-3.48	0.001	-50.50626	-14.007
sin1	-27.48047	3.35078	-8.20	0.000	-34.07235	-20.88859
cos1	-50.18561	4.848967	-10.35	0.000	-59.72482	-40.64639
sin2	-2.087451	1.686128	-1.24	0.217	-5.404517	1.229614
cos2	-5.23183	1.915243	-2.73	0.007	-8.999625	-1.464035
sin3	6.973058	1.686378	4.13	0.000	3.655501	10.29062
cos3	-.1291174	1.178145	-0.11	0.913	-2.446845	2.18861
sin4	.8472327	1.356009	0.62	0.533	-1.820401	3.514866
cos4	-2.814588	1.161274	-2.42	0.016	-5.099125	-.5300516
sin5	-.2998344	1.402054	-0.21	0.831	-3.05805	2.458381
cos5	-.7451913	1.624699	-0.46	0.647	-3.94141	2.451027
sin6	.6951099	2.30592	0.30	0.763	-3.841252	5.231472
cos6	3.860197	15.2181	0.25	0.800	-26.07787	33.79826
dppt_ms30	-1.313233	.3058602	-4.29	0.000	-1.914942	-.7115244
dppt_ms30_lag1	-2.111125	.3379764	-6.25	0.000	-2.776014	-1.446235
dtmax_ma30	1.583812	.4999652	3.17	0.002	.600247	2.567378
1.tubbsfire	-7.457596	5.672012	-1.31	0.189	-18.61596	3.700769
1.drght1516	-18.05618	4.5563	-3.96	0.000	-27.01964	-9.092718
1.drght21	-26.06809	8.181814	-3.19	0.002	-42.16391	-9.972277
_cons	474.9178	42.37608	11.21	0.000	391.5527	558.2829
sigma_u	292.69408					
sigma_e	168.19695					
rho	.75175321	(fraction of variance due to u_i)				

Appendix B - GRC and ACAM Forecast Performance

In this appendix, we compare the performance of a simple and weather-normalized ACAM to the GRC sales forecasts over the period 2010-2021 using Cal Am's Ventura District. We also provide an example showing how sales are weather-normalized.

Actual sales (in thousands of CCF), the GRC sales forecasts, and the resulting forecast errors are shown in Table B1. The same thing is shown for the simple and weather-normalized ACAM sales forecasts in Tables B2 and B3, respectively.

The percentage forecast error is calculated as follows:

$$Error = \frac{Actual - Forecast}{Actual}$$

The mean absolute percentage error (MAPE) is calculated as follows:

$$MAPE = \frac{1}{N} \sum_{i=1}^N |Error_i|$$

where N is the number of forecasts, which is 12 in these examples.

The MAPE for the GRC sales forecasts is 13.5%. The MAPEs for the simple and weather-normalized ACAMs are 7.6% and 6.7%, respectively. Thus, the weather-normalized ACAM provides a 50% improvement in forecast accuracy over the GRC sales forecasts for the 12-year period considered.

California American Water 2022 GRC Sales Forecast

Table B1. Ventura District Actual Sales and GRC Sales Forecasts in Thousands of CCF

Actual Sales

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential	5,121.9	4,218.8	4,307.7	4,623.7	4,713.8	4,580.2	3,512.3	3,286.8	3,518.1	3,724.4	3,403.9	3,749.7	3,758.6
Commercial	1,215.2	1,194.5	1,245.8	1,376.4	1,340.4	1,460.2	1,090.4	1,092.0	1,211.6	1,260.3	1,189.1	1,222.6	1,281.8
Industrial	597.1	602.3	668.8	693.9	698.7	728.2	643.7	616.5	617.3	575.7	522.7	574.0	546.2
Public Authority	502.6	426.1	454.7	476.0	509.8	579.7	391.1	411.2	398.3	427.3	369.2	395.9	472.9
Total	7,436.7	6,441.7	6,677.0	7,170.0	7,262.8	7,348.2	5,637.4	5,406.4	5,745.2	5,987.7	5,484.9	5,942.2	6,059.5

GRC Sales Forecasts

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential		5,295.3	4,376.7	4,738.1	4,378.1	4,316.9	4,504.0	4,504.0	4,516.6	4,212.2	4,221.8	4,221.8	3,916.5
Commercial		1,379.2	1,240.4	1,258.8	1,258.8	1,784.9	1,332.9	1,361.8	1,394.7	1,340.9	1,349.6	1,349.6	1,389.7
Industrial		651.3	640.5	640.5	640.5	596.1	658.8	669.7	669.7	679.6	679.6	679.6	639.1
Public Authority		512.0	441.5	441.5	441.5	518.6	460.8	465.0	465.0	496.2	496.2	496.2	385.4
Total		7,837.8	6,699.1	7,078.9	6,718.9	7,216.5	6,956.5	7,000.5	7,046.0	6,728.9	6,747.2	6,747.2	6,330.7

GRC Forecast Error (%)

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	MAPE
Residential		-25.5%	-1.6%	-2.5%	7.1%	5.7%	-28.2%	-37.0%	-28.4%	-13.1%	-24.0%	-12.6%	-4.2%	15.8%
Commercial		-15.5%	0.4%	8.5%	6.1%	-22.2%	-22.2%	-24.7%	-15.1%	-6.4%	-13.5%	-10.4%	-8.4%	12.8%
Industrial		-8.1%	4.2%	7.7%	8.3%	18.1%	-2.4%	-8.6%	-8.5%	-18.0%	-30.0%	-18.4%	-17.0%	12.5%
Public Authority		-20.2%	2.9%	7.3%	13.4%	10.5%	-17.8%	-13.1%	-16.8%	-16.1%	-34.4%	-25.3%	18.5%	16.4%
Total		-21.7%	-0.3%	1.3%	7.5%	1.8%	-23.4%	-29.5%	-22.6%	-12.4%	-23.0%	-13.5%	-4.5%	13.5%

California American Water 2022 GRC Sales Forecast

Table B2. Ventura District Actual Sales and Simple ACAM Sales Forecasts in Thousands of CCF

Actual Sales

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential	5,121.9	4,218.8	4,307.7	4,623.7	4,713.8	4,580.2	3,512.3	3,286.8	3,518.1	3,724.4	3,403.9	3,749.7	3,758.6
Commercial	1,215.2	1,194.5	1,245.8	1,376.4	1,340.4	1,460.2	1,090.4	1,092.0	1,211.6	1,260.3	1,189.1	1,222.6	1,281.8
Industrial	597.1	602.3	668.8	693.9	698.7	728.2	643.7	616.5	617.3	575.7	522.7	574.0	546.2
Public Authority	502.6	426.1	454.7	476.0	509.8	579.7	391.1	411.2	398.3	427.3	369.2	395.9	472.9
Total	7,436.7	6,441.7	6,677.0	7,170.0	7,262.8	7,348.2	5,637.4	5,406.4	5,745.2	5,987.7	5,484.9	5,942.2	6,059.5

Simple ACAM Sales Forecasts

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential		5,121.9	4,218.8	4,307.7	4,623.7	4,713.8	4,580.2	3,512.3	3,286.8	3,518.1	3,724.4	3,403.9	3,749.7
Commercial		1,215.2	1,194.5	1,245.8	1,376.4	1,340.4	1,460.2	1,090.4	1,092.0	1,211.6	1,260.3	1,189.1	1,222.6
Industrial		597.1	602.3	668.8	693.9	698.7	728.2	643.7	616.5	617.3	575.7	522.7	574.0
Public Authority		502.6	426.1	454.7	476.0	509.8	579.7	391.1	411.2	398.3	427.3	369.2	395.9
Total		7,436.7	6,441.7	6,677.0	7,170.0	7,262.8	7,348.2	5,637.4	5,406.4	5,745.2	5,987.7	5,484.9	5,942.2

Simple ACAM Forecast Error (%)

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	MAPE
Residential		-21.4%	2.1%	6.8%	1.9%	-2.9%	-30.4%	-6.9%	6.6%	5.5%	-9.4%	9.2%	0.2%	8.6%
Commercial		-1.7%	4.1%	9.5%	-2.7%	8.2%	-33.9%	0.1%	9.9%	3.9%	-6.0%	2.7%	4.6%	7.3%
Industrial		0.9%	10.0%	3.6%	0.7%	4.0%	-13.1%	-4.4%	0.1%	-7.2%	-10.1%	8.9%	-5.1%	5.7%
Public Authority		-17.9%	6.3%	4.5%	6.6%	12.0%	-48.2%	4.9%	-3.2%	6.8%	-15.7%	6.8%	16.3%	12.4%
Total		-15.4%	3.5%	6.9%	1.3%	1.2%	-30.3%	-4.3%	5.9%	4.1%	-9.2%	7.7%	1.9%	7.6%

California American Water 2022 GRC Sales Forecast

Table B3. Ventura District Actual Sales and Weather-Normalized ACAM Sales Forecasts in Thousands of CCF

Actual Sales

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential	5,121.9	4,218.8	4,307.7	4,623.7	4,713.8	4,580.2	3,512.3	3,286.8	3,518.1	3,724.4	3,403.9	3,749.7	3,758.6
Commercial	1,215.2	1,194.5	1,245.8	1,376.4	1,340.4	1,460.2	1,090.4	1,092.0	1,211.6	1,260.3	1,189.1	1,222.6	1,281.8
Industrial	597.1	602.3	668.8	693.9	698.7	728.2	643.7	616.5	617.3	575.7	522.7	574.0	546.2
Public Authority	502.6	426.1	454.7	476.0	509.8	579.7	391.1	411.2	398.3	427.3	369.2	395.9	472.9
Total	7,436.7	6,441.7	6,677.0	7,170.0	7,262.8	7,348.2	5,637.4	5,406.4	5,745.2	5,987.7	5,484.9	5,942.2	6,059.5

Weather-Normalized ACAM Sales Forecasts

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Residential	5,121.9	4,218.8	4,307.7	4,623.7	4,713.8	4,580.2	3,512.3	3,286.8	3,518.1	3,724.4	3,403.9	3,749.7	3,758.6
Commercial	1,215.2	1,194.5	1,245.8	1,376.4	1,340.4	1,460.2	1,090.4	1,092.0	1,211.6	1,260.3	1,189.1	1,222.6	1,281.8
Industrial	597.1	602.3	668.8	693.9	698.7	728.2	643.7	616.5	617.3	575.7	522.7	574.0	546.2
Public Authority	502.6	426.1	454.7	476.0	509.8	579.7	391.1	411.2	398.3	427.3	369.2	395.9	472.9
Total	7,436.7	6,441.7	6,677.0	7,170.0	7,262.8	7,348.2	5,637.4	5,406.4	5,745.2	5,987.7	5,484.9	5,942.2	6,059.5

Weather-Normalized ACAM Forecast Error (%)

Class	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	MAPE
Residential	-23.7%	-7.8%	1.5%	2.0%	0.0%	-25.9%	-3.6%	6.9%	5.8%	-8.3%	3.7%	0.9%	7.5%	
Commercial	-2.9%	-7.3%	4.1%	-2.0%	11.7%	-28.9%	3.6%	10.3%	2.6%	-4.9%	-5.0%	5.7%	7.4%	
Industrial	0.6%	5.2%	0.7%	1.1%	6.7%	-10.7%	-2.3%	0.6%	-8.0%	-9.5%	4.9%	-4.5%	4.6%	
Public Authority	-23.1%	-8.3%	-5.0%	5.7%	14.0%	-39.6%	8.1%	-3.5%	9.6%	-13.8%	1.3%	17.0%	12.4%	
Total	-17.5%	-6.4%	1.5%	1.4%	4.1%	-25.7%	-1.1%	6.2%	4.1%	-8.0%	1.8%	2.7%	6.7%	

Weather normalizing can be done using the weather semi-elasticities reported in Tables 17, 18, 19. This is illustrated for Ventura District residential sales in 2019 in Table B4. First, monthly rainfall and temperature deviations are calculated. The rainfall deviation is the difference between the actual and the long-term average rainfall for the month.¹⁵ Next, the rainfall and temperature deviations are multiplied by their corresponding semi-elasticity. The semi-elasticity gives the expected percentage change in sales given a one unit increase in the corresponding weather variable. For example, the semi-elasticity for contemporaneous rainfall is -0.0568 which means that when rainfall is 1 inch above average residential sales would be expected to decrease by 5.68%. The rainfall, lagged rainfall, and temperature effects are added together to get the total percentage weather effect on sales. For example, in January the calculated weather effect is as follows:

$$\text{Jan Weather Effect} = 2.30(-0.0568) - 1.45(-0.0245) + 0.11(0.0094) = -0.0941$$

Thus, January sales were 9.4% lower than would be expected under average (or normal) weather conditions.

The sales normalization factor is then calculated as the reciprocal of one plus the weather effect:

$$\text{Sales Normalization Factor} = \frac{1}{1 + \text{Weather Effect}}$$

For January, the sales normalization factor is therefore:

$$\text{Jan Normalization Factor} = \frac{1}{1 - 0.0941} = 1.104 \text{ or } 110.4\%$$

In other words, under normal weather conditions January sales would have been 10.4% higher than observed.

The last step is to multiply each month's sales normalization factor by the month's share of annual sales and then sum the results. This yields the annual sales normalization factor. In the example in Table B4, the annual sales normalization factor is 106.1%. In other words, had weather in 2019 been normal, residential sales would have been 6.1% higher than observed. Multiplying annual sales by the annual normalization factor yields the weather-normalized sales estimate. In this example, actual residential sales are 3,403.9 KCCF and weather-normalized residential sales are 3,614.2 KCCF.

The weather normalization calculations can be easily automated in an Excel workbook or other software. Thus, computing a weather-normalized ACAM does not pose any significant analytical challenges or computational burdens.

¹⁵ For this example, rainfall and maximum daily air temperature data were downloaded from Oregon State University's PRISM website for latitude 34.2 and longitude -118.8333.

Table B4. Ventura District Weather Normalized 2019 Residential Sales

Month	Rainfall Deviation (Inches)	Lagged Rainfall (Inches)	Temp Deviation (Degree F)	Semi-Elasticities			Annual Sales Share (%)	Sales Normalization Factor (%)
				Rainfall Deviation (% Change in Sales/Inch)	Lagged Rainfall (% Change in Sales/Inch)	Temp Deviation (% Change in Sales/Degree F)		
Jan	2.30	-1.45	0.11	-0.0568	-0.0245	0.0094	6.2%	110.4%
Feb	4.86	2.30	-4.68	-0.0568	-0.0245	0.0094	4.4%	160.3%
Mar	0.12	4.86	-4.10	-0.0568	-0.0245	0.0094	4.5%	119.6%
Apr	-0.40	0.12	0.27	-0.0568	-0.0245	0.0094	7.1%	97.8%
May	0.71	-0.40	-4.03	-0.0568	-0.0245	0.0094	8.9%	107.3%
Jun	0.02	0.71	-1.97	-0.0568	-0.0245	0.0094	9.1%	103.8%
Jul	-0.12	0.02	-0.20	-0.0568	-0.0245	0.0094	10.6%	99.6%
Aug	-0.01	-0.12	0.84	-0.0568	-0.0245	0.0094	11.2%	98.9%
Sep	-0.09	-0.01	1.01	-0.0568	-0.0245	0.0094	10.3%	98.5%
Oct	-0.23	-0.09	-0.53	-0.0568	-0.0245	0.0094	11.0%	99.0%
Nov	1.36	-0.23	2.87	-0.0568	-0.0245	0.0094	9.4%	104.7%
Dec	1.41	1.36	-1.60	-0.0568	-0.0245	0.0094	7.3%	114.7%
Annual								106.1%
Actual Sales (Thou. CCF)								3,403.9
Weather Normalized Sales (Thou. CCF)								3,612.4

ATTACHMENT 3



CALIFORNIA AMERICAN WATER RATE DESIGN BILL IMPACT ANALYSIS

2022 General Rate Case



Prepared by
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Oakland, CA

June 2022

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Introduction

This report contains a series of technical memoranda evaluating the impacts to customer bills of alternative rate designs and rate consolidations in Cal Am's Southern, Central, and Northern Divisions.

Southern Division Technical Memorandum

Date: June 29, 2022

To: Jeffrey Linam

Fr: David Mitchell

Re: Southern Division Purchased Water Consolidation and Fixed Cost Recovery Analysis

1 Introduction

This memorandum summarizes the results of our analysis of the impacts of further consolidating Southern Division purchased water costs and increasing the recovery of fixed costs from meter charges on customer bills and water use. We completed this analysis using a bill impact model we developed for the Southern Division. The bill impact model is based on bill tabulations for 2021 and is calibrated to replicate the Southern Division's current rate design and cost recovery. The remainder of this memorandum is organized as follows. In the next section, we describe the data, assumptions, and structure of the bill impact model. Following this, we describe the purchased water consolidation and fixed cost recovery scenarios that we analyzed. We then summarize the estimated impacts to customer water use and bills.

2 Bill Impact Model

The bill impact model calculates customer bills under the current and an alternative rate design. The model solves for the standard meter charge and single-quantity rates (base and purchased water) for the alternative rate design that satisfy the following constraints:

- Southern Division sales revenue = Southern Division revenue requirement
- Meter charge revenue recovers portion of Southern Division fixed costs specified by the user. The current rate design is intended to recover 39% of fixed costs (20% of total revenue requirement) from service charges.
- Commodity rates consolidate portion of District purchased water costs specified by the user

The revenue requirement is the sum of Southern Division fixed costs and variable purchased water, power, and chemical costs. Power and chemical costs are assumed to be proportional to total Southern Division water sales. Purchased water costs vary by district. Unit purchased water costs for each district were provided by Cal Am.

Water sales are assumed to be a function of the variable cost of water paid by customers. The model is calibrated to 2021 actual water sales. The model calculates the change in customer water sales under the alternative rate design based on the percentage change in the volume charge for each customer. These adjustments are governed by the demand elasticities shown in Table 1, which were estimated

with econometric models of customer water use developed for the 2022 General Rate Case sales forecast.¹

Table 1. Demand Elasticities used in Bill Impact Model

District	Residential Elasticity	Non-Residential Elasticity
Baldwin Hills	-0.022	-0.026
Duarte	-0.109	-0.099
San Marino	-0.126	-0.175
San Diego	-0.476	-0.388
Ventura	-0.455	-0.328

The model is calibrated to replicate the underlying assumptions of the current rate design. These assumptions are as follows:

- All fixed costs and variable power and chemical costs are consolidated.
- 70% of Baldwin Hills' and Ventura's purchased water costs are consolidated.
- 100% of Duarte's and San Marino's purchased water costs are consolidated.
- 40% of San Diego's purchased water costs are consolidated.
- Meter charges recover 20% of Southern Division's total revenue requirement. Or equivalently, 39% of Southern Division's fixed cost is recovered from meter charges.
- The non-residential rate is set to the base SQR plus the district's purchased water SQR.
- The base SQR and district's purchased water SQR are scaled by the following percentages to establish the residential rate in each tier.
 - Tier 1: 80%
 - Tier 2: 115%
 - Tier 3: 132%
 - Tier 4: 148.3%
- The tier widths, CAP discount, CAP surcharge, and charges for private fire service are the same as the current rate design.

The calibrated standard meter charge and base SQR differ slightly from the current rates posted on Cal Am's website because the revenue requirement and sales volumes based on actual 2021 sales differ somewhat from the assumptions Cal Am used to calculate its posted rates. These differences are shown in Table 2. The posted and model calibrated rates are provided in Table 3.

Table 2. Difference in Water Sales and Revenue Requirement

Model Variable	Used by Cal Am to Calculate Current Rates and Charges	Based on 2021 Billing Data
Water Sales (CCF)	17,530,340	17,024,391
Revenue Requirement	124,390,848	123,218,846
Fixed Costs	63,974,574	63,974,574
Variable Costs	60,416,273	59,244,271

¹ M.Cubed. April 2022. California American Sales Forecast: 2022 General Rate Case. Report prepared by M.Cubed for California American Water Company, Tables 15 and 16.

Table 3. Comparison of Posted and Model Calibrated Rates

Rate	Based on Sales Assumptions Used by Cal Am to Calculate Rates and Charges	Calibrated to 2021 Billing Data
Standard Meter Charge	16.52	16.77
Base SQR (\$/CCF)	4.31	4.62
Purchased Water SQR (\$/CCF)		
Baldwin Hills	0.52	0.52
Duarte	0.00	0.00
San Marino	0.00	0.00
San Diego	3.33	3.33
Ventura	1.21	1.21

3 Purchased Water Consolidation and Fixed Cost Recovery Scenarios

The purchased water consolidation and meter charge fixed cost recovery scenarios we evaluated are provided in Table 4. A range of purchased water consolidation and fixed cost recovery options were modeled. Additionally, the CAP discount, which applies to the meter charge and the first two tier rates, was increased from 20% to 25% in Scenarios 12 and 13.

Table 4. Purchased Water Consolidation and Meter Charge Fixed Cost Recovery Scenarios

Scenario	Consolidated Purchased Water Cost %					Meter Charge Fixed Cost Recovery	CAP Discount
	LA- Baldwin Hills	LA- Duarte	LA- San Marino	San Diego	Ventura		
Current	70%	100%	100%	40%	70%	39%	20%
Scenario 1	85%	100%	100%	70%	85%	39%	20%
Scenario 2	100%	100%	100%	100%	100%	39%	20%
Scenario 3	85%	100%	100%	70%	85%	45%	20%
Scenario 4	100%	100%	100%	100%	100%	45%	20%
Scenario 5	85%	100%	100%	70%	85%	50%	20%
Scenario 6	100%	100%	100%	100%	100%	50%	20%
Scenario 7	85%	100%	100%	70%	85%	55%	20%
Scenario 8	100%	100%	100%	100%	100%	55%	20%
Scenario 9	85%	100%	100%	70%	85%	60%	20%
Scenario 10	100%	100%	100%	100%	100%	60%	20%
Scenario 11	90%	100%	100%	50%	80%	50%	20%
Scenario 12	90%	100%	100%	50%	80%	50%	25%
Scenario 13	90%	100%	100%	53%	75%	50%	25%

4 Model Results: Standard Meter Charge and SQRs

Tables 5 and 6 show the standard meter charge and the sum of the base and purchased water SQRs by scenario, respectively.

Table 5. Standard Meter Charge by Rate Design Scenario

Scenario	Fixed Cost Recovered	Standard Meter Charge	% of Current
Current	39%	16.77	
Scenarios 1 & 2	39%	16.77	100%
Scenarios 3 & 4	45%	19.66	117%
Scenarios 5, 6, 11, 12, 13	50%	21.88	130%
Scenarios 7 & 8	55%	24.11	144%
Scenarios 9 & 10	60%	26.34	157%

Table 6. Base + Purchased Water SQRs by Rate Design Scenario

Scenario	Baldwin Hills	Duarte	San Marino	San Diego	Ventura
Current	5.14	4.62	4.62	7.96	5.83
Scenario 1	5.49	5.24	5.24	6.89	5.86
Scenario 2	5.89	5.89	5.89	5.89	5.89
Scenario 3	5.22	4.96	4.96	6.61	5.59
Scenario 4	5.63	5.63	5.63	5.63	5.63
Scenario 5	5.01	4.76	4.76	6.41	5.38
Scenario 6	5.42	5.42	5.42	5.42	5.42
Scenario 7	4.81	4.55	4.55	6.20	5.18
Scenario 8	5.23	5.23	5.23	5.23	5.23
Scenario 9	4.61	4.36	4.36	6.00	4.98
Scenario 10	5.03	5.03	5.03	5.03	5.03
Scenario 11	4.60	4.42	4.42	7.17	5.25
Scenario 12	4.59	4.42	4.42	7.17	5.25
Scenario 13	4.56	4.39	4.39	6.97	5.43
% of Current					
Scenario 1	107%	113%	113%	87%	101%
Scenario 2	115%	127%	127%	74%	101%
Scenario 3	102%	107%	107%	83%	96%
Scenario 4	109%	122%	122%	71%	97%
Scenario 5	97%	103%	103%	81%	92%
Scenario 6	105%	117%	117%	68%	93%
Scenario 7	94%	99%	99%	78%	89%
Scenario 8	102%	113%	113%	66%	90%
Scenario 9	90%	94%	94%	75%	85%
Scenario 10	98%	109%	109%	63%	86%
Scenario 11	89%	96%	96%	90%	90%
Scenario 12	89%	96%	96%	90%	90%
Scenario 13	89%	95%	95%	88%	93%

5 Model Results: Water Sales

Table 7 shows the estimated change in Southern Division water sales by scenario. The following results obtain with respect to the expected change in water sales.

- Further consolidation of purchased water costs causes Southern Division water sales to increase by one to two percent. The increase is driven by higher water use by San Diego customers. Water sales in the other districts decrease, but not by enough to offset the increase in San Diego.
- Recovering more fixed costs from meter charges causes Southern Division water sales to increase. Southern Division water sales increase by roughly 1.2% for each five percentage point increase in fixed cost recovered by meter charges. Thus, going from 39% to 60% of fixed cost recovered by meter charges increases Southern Division water sales by approximately 4.8%.
- The largest increases in sales are in San Diego followed by Ventura. Changes in sales in the Los Angeles districts are much smaller and more mixed.
- The sales increases reported in Table 7 are predicated on net revenue neutrality and thus are measuring only the impact of the rate design on water use. Increases in the net revenue requirement due to rising operating costs will work in the opposite direction. The bill impact model indicates that water use would not change in the Southern Division under Cal Am's proposed rates. In other words, the increase in water use due to the change in the rate design would be fully offset by the decrease in sales due to the higher revenue requirement.

Table 7. Change in Southern Division Water Sales by Scenario

Scenario	% Change in Water Sales from Current					
	Baldwin Hills	Duarte	San Marino	San Diego	Ventura	Total
Scenario 1	-0.2%	-1.3%	-1.7%	6.4%	-0.2%	0.9%
Scenario 2	-0.3%	-2.5%	-3.3%	13.7%	-0.4%	2.1%
Scenario 3	0.0%	-0.7%	-1.0%	8.3%	1.7%	2.3%
Scenario 4	-0.2%	-2.0%	-2.7%	16.0%	1.5%	3.5%
Scenario 5	0.1%	-0.3%	-0.4%	9.7%	3.3%	3.4%
Scenario 6	-0.1%	-1.7%	-2.2%	17.9%	3.0%	4.6%
Scenario 7	0.2%	0.2%	0.2%	11.3%	4.9%	4.5%
Scenario 8	0.0%	-1.3%	-1.7%	19.7%	4.5%	5.8%
Scenario 9	0.2%	0.6%	0.8%	12.8%	6.6%	5.7%
Scenario 10	0.0%	-0.9%	-1.2%	21.7%	6.1%	7.0%
Scenario 11	0.3%	0.5%	0.6%	4.5%	4.3%	2.8%
Scenario 12	0.3%	0.5%	0.7%	4.8%	4.4%	2.9%
Scenario 13	0.3%	0.6%	0.8%	6.1%	3.0%	2.8%

6 Model Results: Revenue Requirement

Table 8 shows the change in Southern Division revenue requirement by scenario. The following results obtain with respect to Southern Division revenue requirement.

- All scenarios result in higher Southern Division revenue requirements due to the increase in water sales and therefore higher purchased water, power, and chemical costs.
- Southern Division revenue requirements increase from 1 to 5 percent, depending on the fixed cost recovery and purchased water consolidation scenario.
- Revenue requirement scales not quite linearly with the change in water sales due to differential rates of change in water use and differences in purchased water costs across the five districts.

Table 8. Change in Southern Division Revenue Requirement by Scenario

Scenario	Water Sales % of Current	Revenue Requirement	Revenue Requirement% of Current
Current	100%	123,218,846	100%
Scenario 1	101%	124,482,761	101%
Scenario 2	102%	125,972,195	102%
Scenario 3	102%	125,474,900	102%
Scenario 4	103%	127,032,793	103%
Scenario 5	103%	126,266,806	102%
Scenario 6	105%	127,879,724	104%
Scenario 7	105%	127,082,814	103%
Scenario 8	106%	128,753,301	104%
Scenario 9	106%	127,924,156	104%
Scenario 10	107%	129,653,510	105%
Scenario 11	103%	124,750,962	102%
Scenario 12	103%	124,424,318	101%
Scenario 13	103%	125,466,574	102%

7 Model Results: Bill Impacts

Bill impacts associated with each scenario are shown in the following tables. Impacts are shown for:

- The average residential bill
- The average non-CAP and CAP residential bills overall and by usage level
- The average non-residential bill

Water usage percentiles for each district are provided in Table 9 for reference. These may be useful in conjunction with the bill impacts by customer usage level.

Table 9. District Usage Percentiles in CCF

District	P01	P05	P10	P25	P50	P75	P90	P95	P99
LA-Baldwin Hills	0	1	3	6	11	17	25	32	51
LA-Duarte	0	1	3	6	11	17	25	33	69
LA-San Marino	0	2	4	8	13	23	39	53	92
San Diego	0	1	2	4	7	10	16	20	34
Ventura	0	2	3	7	13	21	32	41	66
Total	0	1	3	5	10	18	28	37	67

Southern Div. Scenario 1: Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	93.26	4.22	5%
LA-Duarte	84,464	79.46	86.07	6.61	8%
LA-San Marino	150,230	120.90	130.82	9.91	8%
San Diego	226,970	74.87	71.43	-3.44	-5%
Ventura	230,240	114.50	114.71	0.21	0%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	96.18	4.34	5%
LA-Duarte	63,829	85.46	92.53	7.06	8%
LA-San Marino	125,572	131.69	142.51	10.83	8%
San Diego	178,934	79.75	76.09	-3.66	-5%
Ventura	214,969	117.59	117.81	0.22	0%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	70.93	3.25	5%
LA-Duarte	20,635	60.91	66.10	5.19	9%
LA-San Marino	24,658	65.99	71.26	5.26	8%
San Diego	48,036	56.70	54.08	-2.62	-5%
Ventura	15,271	70.96	71.08	0.12	0%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	236.35	11.60	5%
LA-Duarte	9,687	488.36	536.08	47.73	10%
LA-San Marino	19,054	316.86	343.75	26.88	8%
San Diego	29,695	653.60	604.36	-49.24	-8%
Ventura	18,070	883.02	885.66	2.64	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 1: Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	34.78	0.78	2%
LA-Duarte	18,585	31.25	32.49	1.24	4%
LA-San Marino	24,016	34.16	35.37	1.20	4%
San Diego	89,406	38.30	36.89	-1.40	-4%
Ventura	45,165	31.80	31.84	0.04	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	58.46	2.13	4%
LA-Duarte	23,424	47.37	50.65	3.28	7%
LA-San Marino	33,375	52.42	55.69	3.26	6%
San Diego	80,898	65.56	62.14	-3.41	-5%
Ventura	45,466	56.28	56.38	0.10	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	83.69	3.61	5%
LA-Duarte	17,784	67.12	72.48	5.36	8%
LA-San Marino	27,979	75.02	80.33	5.31	7%
San Diego	33,283	99.70	95.46	-4.24	-4%
Ventura	43,823	83.31	83.44	0.13	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	115.84	5.54	5%
LA-Duarte	10,721	92.55	100.71	8.17	9%
LA-San Marino	19,587	105.02	113.16	8.15	8%
San Diego	12,542	147.73	141.40	-6.33	-4%
Ventura	34,474	117.23	117.43	0.20	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	210.65	11.23	6%
LA-Duarte	13,950	203.27	223.00	19.73	10%
LA-San Marino	45,273	252.63	275.68	23.05	9%
San Diego	10,841	285.47	270.85	-14.62	-5%
Ventura	61,312	239.35	239.83	0.49	0%

Southern Div. Scenario 1: Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	35.91	0.80	2%
LA-Duarte	14,479	33.33	34.60	1.28	4%
LA-San Marino	19,496	36.15	37.38	1.23	3%
San Diego	71,446	40.14	38.70	-1.44	-4%
Ventura	40,659	32.59	32.63	0.04	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	60.26	2.19	4%
LA-Duarte	17,378	50.44	53.90	3.46	7%
LA-San Marino	25,934	55.74	59.15	3.41	6%
San Diego	61,931	69.33	65.75	-3.58	-5%
Ventura	41,929	57.35	57.45	0.11	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	85.81	3.69	4%
LA-Duarte	13,149	71.41	77.06	5.65	8%
LA-San Marino	22,376	79.50	85.04	5.54	7%
San Diego	25,702	105.33	100.88	-4.45	-4%
Ventura	41,018	84.55	84.69	0.14	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	118.12	5.64	5%
LA-Duarte	7,870	98.36	107.00	8.64	9%
LA-San Marino	16,239	110.08	118.54	8.46	8%
San Diego	10,249	154.43	147.66	-6.78	-4%
Ventura	32,508	118.72	118.92	0.20	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	213.41	11.35	6%
LA-Duarte	10,953	217.53	238.54	21.00	10%
LA-San Marino	41,527	260.54	284.27	23.74	9%
San Diego	9,606	293.38	278.15	-15.23	-5%
Ventura	58,855	241.63	242.13	0.49	0%

Southern Div. Scenario 1: Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	27.89	0.68	2%
LA-Duarte	4,106	23.93	25.02	1.09	5%
LA-San Marino	4,520	25.60	26.67	1.07	4%
San Diego	17,960	30.96	29.71	-1.25	-4%
Ventura	4,506	24.64	24.67	0.03	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	45.88	1.75	4%
LA-Duarte	6,046	38.54	41.32	2.78	7%
LA-San Marino	7,441	40.87	43.61	2.74	7%
San Diego	18,967	53.24	50.36	-2.87	-5%
Ventura	3,537	43.61	43.69	0.08	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	66.22	2.92	5%
LA-Duarte	4,635	54.95	59.48	4.53	8%
LA-San Marino	5,603	57.13	61.52	4.39	8%
San Diego	7,581	80.63	77.09	-3.54	-4%
Ventura	2,805	65.17	65.28	0.11	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	92.93	4.55	5%
LA-Duarte	2,851	76.50	83.36	6.86	9%
LA-San Marino	3,348	80.44	87.08	6.64	8%
San Diego	2,293	117.75	113.40	-4.34	-4%
Ventura	1,966	92.58	92.72	0.14	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	185.17	10.17	6%
LA-Duarte	2,997	151.12	166.20	15.08	10%
LA-San Marino	3,746	164.98	180.39	15.41	9%
San Diego	1,235	223.88	214.03	-9.86	-4%
Ventura	2,457	184.59	184.91	0.32	0%

Southern Div. Scenario 2: Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	98.02	8.98	10%
LA-Duarte	84,464	79.46	93.00	13.53	17%
LA-San Marino	150,230	120.90	141.19	20.28	17%
San Diego	226,970	74.87	68.00	-6.87	-9%
Ventura	230,240	114.50	114.94	0.44	0%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	101.08	9.25	10%
LA-Duarte	63,829	85.46	99.93	14.47	17%
LA-San Marino	125,572	131.69	153.84	22.15	17%
San Diego	178,934	79.75	72.43	-7.32	-9%
Ventura	214,969	117.59	118.05	0.46	0%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	74.61	6.92	10%
LA-Duarte	20,635	60.91	71.54	10.62	17%
LA-San Marino	24,658	65.99	76.75	10.76	16%
San Diego	48,036	56.70	51.48	-5.21	-9%
Ventura	15,271	70.96	71.20	0.25	0%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	249.44	24.70	11%
LA-Duarte	9,687	488.36	586.35	97.99	20%
LA-San Marino	19,054	316.86	371.80	54.94	17%
San Diego	29,695	653.60	555.88	-97.72	-15%
Ventura	18,070	883.02	888.54	5.52	1%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 2: Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	35.67	1.67	5%
LA-Duarte	18,585	31.25	33.79	2.54	8%
LA-San Marino	24,016	34.16	36.63	2.47	7%
San Diego	89,406	38.30	35.49	-2.80	-7%
Ventura	45,165	31.80	31.88	0.08	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	60.86	4.54	8%
LA-Duarte	23,424	47.37	54.11	6.74	14%
LA-San Marino	33,375	52.42	59.11	6.69	13%
San Diego	80,898	65.56	58.79	-6.77	-10%
Ventura	45,466	56.28	56.49	0.22	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	87.76	7.68	10%
LA-Duarte	17,784	67.12	78.10	10.97	16%
LA-San Marino	27,979	75.02	85.87	10.85	14%
San Diego	33,283	99.70	91.24	-8.46	-8%
Ventura	43,823	83.31	83.59	0.28	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	122.10	11.80	11%
LA-Duarte	10,721	92.55	109.26	16.72	18%
LA-San Marino	19,587	105.02	121.66	16.65	16%
San Diego	12,542	147.73	135.16	-12.57	-9%
Ventura	34,474	117.23	117.64	0.42	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	223.32	23.91	12%
LA-Duarte	13,950	203.27	243.68	40.41	20%
LA-San Marino	45,273	252.63	299.78	47.15	19%
San Diego	10,841	285.47	255.77	-29.70	-10%
Ventura	61,312	239.35	240.36	1.01	0%

Southern Div. Scenario 2: Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	36.82	1.70	5%
LA-Duarte	14,479	33.33	35.95	2.62	8%
LA-San Marino	19,496	36.15	38.68	2.53	7%
San Diego	71,446	40.14	37.26	-2.88	-7%
Ventura	40,659	32.59	32.67	0.08	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	62.73	4.66	8%
LA-Duarte	17,378	50.44	57.54	7.10	14%
LA-San Marino	25,934	55.74	62.74	7.00	13%
San Diego	61,931	69.33	62.23	-7.10	-10%
Ventura	41,929	57.35	57.56	0.22	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	89.98	7.85	10%
LA-Duarte	13,149	71.41	82.98	11.57	16%
LA-San Marino	22,376	79.50	90.82	11.32	14%
San Diego	25,702	105.33	96.45	-8.88	-8%
Ventura	41,018	84.55	84.84	0.28	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	124.49	12.01	11%
LA-Duarte	7,870	98.36	116.04	17.68	18%
LA-San Marino	16,239	110.08	127.37	17.28	16%
San Diego	10,249	154.43	140.88	-13.55	-9%
Ventura	32,508	118.72	119.14	0.42	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	226.22	24.16	12%
LA-Duarte	10,953	217.53	260.56	43.03	20%
LA-San Marino	41,527	260.54	309.11	48.57	19%
San Diego	9,606	293.38	262.49	-30.89	-11%
Ventura	58,855	241.63	242.66	1.03	0%

Southern Div. Scenario 2: Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	28.65	1.44	5%
LA-Duarte	4,106	23.93	26.17	2.24	9%
LA-San Marino	4,520	25.60	27.79	2.19	9%
San Diego	17,960	30.96	28.46	-2.50	-8%
Ventura	4,506	24.64	24.70	0.06	0%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	47.86	3.73	8%
LA-Duarte	6,046	38.54	44.25	5.71	15%
LA-San Marino	7,441	40.87	46.49	5.62	14%
San Diego	18,967	53.24	47.54	-5.70	-11%
Ventura	3,537	43.61	43.78	0.17	0%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	69.51	6.22	10%
LA-Duarte	4,635	54.95	64.23	9.28	17%
LA-San Marino	5,603	57.13	66.11	8.98	16%
San Diego	7,581	80.63	73.58	-7.05	-9%
Ventura	2,805	65.17	65.40	0.23	0%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	98.06	9.68	11%
LA-Duarte	2,851	76.50	90.54	14.04	18%
LA-San Marino	3,348	80.44	94.00	13.56	17%
San Diego	2,293	117.75	109.56	-8.18	-7%
Ventura	1,966	92.58	92.87	0.30	0%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	196.64	21.64	12%
LA-Duarte	2,997	151.12	181.97	30.85	20%
LA-San Marino	3,746	164.98	196.45	31.47	19%
San Diego	1,235	223.88	203.45	-20.43	-9%
Ventura	2,457	184.59	185.26	0.67	0%

Southern Div. Scenario 3: Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	94.16	5.12	6%
LA-Duarte	84,464	79.46	86.70	7.23	9%
LA-San Marino	150,230	120.90	131.75	10.85	9%
San Diego	226,970	74.87	73.72	-1.15	-2%
Ventura	230,240	114.50	116.21	1.71	1%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	97.11	5.27	6%
LA-Duarte	63,829	85.46	93.26	7.80	9%
LA-San Marino	125,572	131.69	143.47	11.79	9%
San Diego	178,934	79.75	78.54	-1.21	-2%
Ventura	214,969	117.59	119.31	1.72	1%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	71.60	3.92	6%
LA-Duarte	20,635	60.91	66.39	5.48	9%
LA-San Marino	24,658	65.99	72.06	6.07	9%
San Diego	48,036	56.70	55.76	-0.94	-2%
Ventura	15,271	70.96	72.49	1.53	2%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	235.70	10.95	5%
LA-Duarte	9,687	488.36	529.70	41.35	8%
LA-San Marino	19,054	316.86	343.49	26.63	8%
San Diego	29,695	653.60	603.37	-50.23	-8%
Ventura	18,070	883.02	882.21	-0.80	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 3: Average Residential Bill by Usage Range

0-5 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,816	34.00	37.81	3.81	11%
LA-Duarte	18,585	31.25	35.33	4.08	13%
LA-San Marino	24,016	34.16	38.73	4.57	13%
San Diego	89,406	38.30	39.62	1.32	3%
Ventura	45,165	31.80	34.50	2.70	8%

6-10 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	17,085	56.32	60.79	4.47	8%
LA-Duarte	23,424	47.37	52.38	5.01	11%
LA-San Marino	33,375	52.42	58.22	5.79	11%
San Diego	80,898	65.56	64.28	-1.28	-2%
Ventura	45,466	56.28	58.58	2.30	4%

11-15 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,358	80.08	85.10	5.01	6%
LA-Duarte	17,784	67.12	73.35	6.23	9%
LA-San Marino	27,979	75.02	82.43	7.41	10%
San Diego	33,283	99.70	97.57	-2.13	-2%
Ventura	43,823	83.31	85.50	2.19	3%

16-20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	9,111	110.30	115.90	5.60	5%
LA-Duarte	10,721	92.55	100.37	7.83	8%
LA-San Marino	19,587	105.02	114.65	9.64	9%
San Diego	12,542	147.73	143.37	-4.36	-3%
Ventura	34,474	117.23	119.08	1.85	2%

>20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	11,863	199.41	206.85	7.44	4%
LA-Duarte	13,950	203.27	219.25	15.99	8%
LA-San Marino	45,273	252.63	273.18	20.55	8%
San Diego	10,841	285.47	271.63	-13.84	-5%
Ventura	61,312	239.35	239.47	0.12	0%

Southern Div. Scenario 3: Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	39.05	3.93	11%
LA-Duarte	14,479	33.33	37.68	4.35	13%
LA-San Marino	19,496	36.15	40.99	4.84	13%
San Diego	71,446	40.14	41.60	1.45	4%
Ventura	40,659	32.59	35.36	2.76	8%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	62.68	4.61	8%
LA-Duarte	17,378	50.44	55.76	5.32	11%
LA-San Marino	25,934	55.74	61.91	6.17	11%
San Diego	61,931	69.33	68.05	-1.28	-2%
Ventura	41,929	57.35	59.70	2.35	4%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	87.27	5.14	6%
LA-Duarte	13,149	71.41	78.04	6.63	9%
LA-San Marino	22,376	79.50	87.40	7.90	10%
San Diego	25,702	105.33	103.18	-2.15	-2%
Ventura	41,018	84.55	86.78	2.23	3%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	118.20	5.72	5%
LA-Duarte	7,870	98.36	106.71	8.36	8%
LA-San Marino	16,239	110.08	120.27	10.19	9%
San Diego	10,249	154.43	149.77	-4.67	-3%
Ventura	32,508	118.72	120.59	1.87	2%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	209.67	7.61	4%
LA-Duarte	10,953	217.53	234.84	17.30	8%
LA-San Marino	41,527	260.54	281.81	21.27	8%
San Diego	9,606	293.38	279.06	-14.32	-5%
Ventura	58,855	241.63	241.76	0.12	0%

Southern Div. Scenario 3: Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	30.29	3.08	11%
LA-Duarte	4,106	23.93	27.06	3.13	13%
LA-San Marino	4,520	25.60	29.01	3.41	13%
San Diego	17,960	30.96	31.74	0.78	3%
Ventura	4,506	24.64	26.74	2.10	9%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	47.58	3.46	8%
LA-Duarte	6,046	38.54	42.64	4.11	11%
LA-San Marino	7,441	40.87	45.34	4.47	11%
San Diego	18,967	53.24	51.97	-1.27	-2%
Ventura	3,537	43.61	45.38	1.77	4%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	67.25	3.95	6%
LA-Duarte	4,635	54.95	60.05	5.10	9%
LA-San Marino	5,603	57.13	62.55	5.43	10%
San Diego	7,581	80.63	78.57	-2.06	-3%
Ventura	2,805	65.17	66.77	1.60	2%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	92.74	4.36	5%
LA-Duarte	2,851	76.50	82.87	6.37	8%
LA-San Marino	3,348	80.44	87.40	6.96	9%
San Diego	2,293	117.75	114.76	-2.99	-3%
Ventura	1,966	92.58	94.06	1.49	2%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	180.89	5.90	3%
LA-Duarte	2,997	151.12	162.30	11.18	7%
LA-San Marino	3,746	164.98	177.58	12.60	8%
San Diego	1,235	223.88	213.81	-10.08	-5%
Ventura	2,457	184.59	184.68	0.09	0%

Southern Div. Scenario 4: Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	99.01	9.97	11%
LA-Duarte	84,464	79.46	93.75	14.28	18%
LA-San Marino	150,230	120.90	142.31	21.41	18%
San Diego	226,970	74.87	70.25	-4.62	-6%
Ventura	230,240	114.50	116.50	2.00	2%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	102.10	10.27	11%
LA-Duarte	63,829	85.46	100.80	15.34	18%
LA-San Marino	125,572	131.69	155.01	23.32	18%
San Diego	178,934	79.75	74.84	-4.91	-6%
Ventura	214,969	117.59	119.61	2.02	2%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	75.34	7.66	11%
LA-Duarte	20,635	60.91	71.92	11.01	18%
LA-San Marino	24,658	65.99	77.66	11.67	18%
San Diego	48,036	56.70	53.15	-3.55	-6%
Ventura	15,271	70.96	72.65	1.69	2%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	249.05	24.30	11%
LA-Duarte	9,687	488.36	580.76	92.41	19%
LA-San Marino	19,054	316.86	372.10	55.23	17%
San Diego	29,695	653.60	554.42	-99.18	-15%
Ventura	18,070	883.02	885.77	2.75	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 4: Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	38.71	4.71	14%
LA-Duarte	18,585	31.25	36.65	5.40	17%
LA-San Marino	24,016	34.16	40.02	5.86	17%
San Diego	89,406	38.30	38.20	-0.10	0%
Ventura	45,165	31.80	34.55	2.75	9%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	63.24	6.92	12%
LA-Duarte	23,424	47.37	55.89	8.52	18%
LA-San Marino	33,375	52.42	61.70	9.28	18%
San Diego	80,898	65.56	60.94	-4.61	-7%
Ventura	45,466	56.28	58.72	2.44	4%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	89.25	9.16	11%
LA-Duarte	17,784	67.12	79.07	11.95	18%
LA-San Marino	27,979	75.02	88.08	13.06	17%
San Diego	33,283	99.70	93.21	-6.49	-7%
Ventura	43,823	83.31	85.69	2.38	3%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	122.28	11.97	11%
LA-Duarte	10,721	92.55	109.08	16.53	18%
LA-San Marino	19,587	105.02	123.32	18.31	17%
San Diego	12,542	147.73	137.05	-10.68	-7%
Ventura	34,474	117.23	119.34	2.11	2%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	219.77	20.36	10%
LA-Duarte	13,950	203.27	240.31	37.04	18%
LA-San Marino	45,273	252.63	297.74	45.11	18%
San Diego	10,841	285.47	256.20	-29.27	-10%
Ventura	61,312	239.35	240.13	0.78	0%

Southern Div. Scenario 4: Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	39.97	4.85	14%
LA-Duarte	14,479	33.33	39.04	5.72	17%
LA-San Marino	19,496	36.15	42.31	6.16	17%
San Diego	71,446	40.14	40.14	0.00	0%
Ventura	40,659	32.59	35.41	2.81	9%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	65.20	7.13	12%
LA-Duarte	17,378	50.44	59.46	9.02	18%
LA-San Marino	25,934	55.74	65.56	9.82	18%
San Diego	61,931	69.33	64.55	-4.78	-7%
Ventura	41,929	57.35	59.84	2.49	4%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	91.51	9.39	11%
LA-Duarte	13,149	71.41	84.07	12.66	18%
LA-San Marino	22,376	79.50	93.30	13.80	17%
San Diego	25,702	105.33	98.60	-6.73	-6%
Ventura	41,018	84.55	86.97	2.42	3%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	124.69	12.21	11%
LA-Duarte	7,870	98.36	115.93	17.57	18%
LA-San Marino	16,239	110.08	129.27	19.19	17%
San Diego	10,249	154.43	142.88	-11.56	-7%
Ventura	32,508	118.72	120.86	2.14	2%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	222.73	20.66	10%
LA-Duarte	10,953	217.53	257.25	39.72	18%
LA-San Marino	41,527	260.54	307.10	46.57	18%
San Diego	9,606	293.38	263.05	-30.33	-10%
Ventura	58,855	241.63	242.43	0.79	0%

Southern Div. Scenario 4: Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	31.07	3.86	14%
LA-Duarte	4,106	23.93	28.23	4.30	18%
LA-San Marino	4,520	25.60	30.15	4.55	18%
San Diego	17,960	30.96	30.47	-0.49	-2%
Ventura	4,506	24.64	26.78	2.14	9%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	49.60	5.48	12%
LA-Duarte	6,046	38.54	45.62	7.08	18%
LA-San Marino	7,441	40.87	48.27	7.39	18%
San Diego	18,967	53.24	49.16	-4.07	-8%
Ventura	3,537	43.61	45.49	1.88	4%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	70.61	7.31	12%
LA-Duarte	4,635	54.95	64.88	9.93	18%
LA-San Marino	5,603	57.13	67.23	10.10	18%
San Diego	7,581	80.63	74.94	-5.68	-7%
Ventura	2,805	65.17	66.92	1.75	3%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	97.97	9.59	11%
LA-Duarte	2,851	76.50	90.19	13.69	18%
LA-San Marino	3,348	80.44	94.46	14.02	17%
San Diego	2,293	117.75	110.99	-6.76	-6%
Ventura	1,966	92.58	94.23	1.66	2%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	192.59	17.59	10%
LA-Duarte	2,997	151.12	178.37	27.25	18%
LA-San Marino	3,746	164.98	193.97	28.98	18%
San Diego	1,235	223.88	202.88	-21.00	-9%
Ventura	2,457	184.59	185.12	0.53	0%

Southern Div. Scenario 5 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	94.91	5.87	7%
LA-Duarte	84,464	79.46	87.22	7.75	10%
LA-San Marino	150,230	120.90	132.52	11.62	10%
San Diego	226,970	74.87	75.49	0.62	1%
Ventura	230,240	114.50	117.36	2.86	3%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	97.88	6.05	7%
LA-Duarte	63,829	85.46	93.87	8.41	10%
LA-San Marino	125,572	131.69	144.27	12.58	10%
San Diego	178,934	79.75	80.43	0.68	1%
Ventura	214,969	117.59	120.47	2.88	2%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	72.15	4.47	7%
LA-Duarte	20,635	60.91	66.64	5.73	9%
LA-San Marino	24,658	65.99	72.70	6.71	10%
San Diego	48,036	56.70	57.06	0.37	1%
Ventura	15,271	70.96	73.57	2.61	4%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	235.35	10.60	5%
LA-Duarte	9,687	488.36	525.07	36.71	8%
LA-San Marino	19,054	316.86	343.43	26.56	8%
San Diego	29,695	653.60	602.69	-50.91	-8%
Ventura	18,070	883.02	879.72	-3.30	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 5 Average Residential Bill by Usage Range

0-5 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,816	34.00	40.16	6.16	18%
LA-Duarte	18,585	31.25	37.54	6.29	20%
LA-San Marino	24,016	34.16	41.34	7.18	21%
San Diego	89,406	38.30	41.72	3.42	9%
Ventura	45,165	31.80	36.55	4.75	15%

6-10 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	17,085	56.32	62.61	6.29	11%
LA-Duarte	23,424	47.37	53.73	6.36	13%
LA-San Marino	33,375	52.42	60.19	7.76	15%
San Diego	80,898	65.56	65.93	0.38	1%
Ventura	45,466	56.28	60.28	4.01	7%

11-15 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,358	80.08	86.23	6.15	8%
LA-Duarte	17,784	67.12	74.05	6.93	10%
LA-San Marino	27,979	75.02	84.07	9.05	12%
San Diego	33,283	99.70	99.19	-0.51	-1%
Ventura	43,823	83.31	87.10	3.79	5%

16-20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	9,111	110.30	116.02	5.71	5%
LA-Duarte	10,721	92.55	100.16	7.61	8%
LA-San Marino	19,587	105.02	115.85	10.83	10%
San Diego	12,542	147.73	144.87	-2.86	-2%
Ventura	34,474	117.23	120.35	3.12	3%

>20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	11,863	199.41	204.07	4.66	2%
LA-Duarte	13,950	203.27	216.47	13.21	6%
LA-San Marino	45,273	252.63	271.38	18.75	7%
San Diego	10,841	285.47	272.22	-13.25	-5%
Ventura	61,312	239.35	239.17	-0.18	0%

Southern Div. Scenario 5 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	41.47	6.36	18%
LA-Duarte	14,479	33.33	40.06	6.74	20%
LA-San Marino	19,496	36.15	43.78	7.63	21%
San Diego	71,446	40.14	43.83	3.69	9%
Ventura	40,659	32.59	37.46	4.87	15%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	64.58	6.51	11%
LA-Duarte	17,378	50.44	57.22	6.78	13%
LA-San Marino	25,934	55.74	64.06	8.32	15%
San Diego	61,931	69.33	69.83	0.50	1%
Ventura	41,929	57.35	61.43	4.09	7%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	88.43	6.31	8%
LA-Duarte	13,149	71.41	78.83	7.42	10%
LA-San Marino	22,376	79.50	89.25	9.75	12%
San Diego	25,702	105.33	104.94	-0.39	0%
Ventura	41,018	84.55	88.41	3.86	5%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	118.34	5.86	5%
LA-Duarte	7,870	98.36	106.54	8.18	8%
LA-San Marino	16,239	110.08	121.65	11.57	11%
San Diego	10,249	154.43	151.38	-3.05	-2%
Ventura	32,508	118.72	121.88	3.16	3%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	206.93	4.87	2%
LA-Duarte	10,953	217.53	232.10	14.56	7%
LA-San Marino	41,527	260.54	280.03	19.49	7%
San Diego	9,606	293.38	279.76	-13.63	-5%
Ventura	58,855	241.63	241.46	-0.18	0%

Southern Div. Scenario 5 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	32.16	4.95	18%
LA-Duarte	4,106	23.93	28.64	4.71	20%
LA-San Marino	4,520	25.60	30.82	5.22	20%
San Diego	17,960	30.96	33.31	2.35	8%
Ventura	4,506	24.64	28.33	3.69	15%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	48.92	4.80	11%
LA-Duarte	6,046	38.54	43.68	5.15	13%
LA-San Marino	7,441	40.87	46.69	5.82	14%
San Diego	18,967	53.24	53.22	-0.02	0%
Ventura	3,537	43.61	46.68	3.07	7%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	68.08	4.79	8%
LA-Duarte	4,635	54.95	60.51	5.56	10%
LA-San Marino	5,603	57.13	63.37	6.25	11%
San Diego	7,581	80.63	79.70	-0.93	-1%
Ventura	2,805	65.17	67.93	2.76	4%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	92.65	4.27	5%
LA-Duarte	2,851	76.50	82.53	6.03	8%
LA-San Marino	3,348	80.44	87.68	7.24	9%
San Diego	2,293	117.75	115.77	-1.97	-2%
Ventura	1,966	92.58	95.11	2.53	3%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	177.72	2.73	2%
LA-Duarte	2,997	151.12	159.37	8.25	5%
LA-San Marino	3,746	164.98	175.49	10.50	6%
San Diego	1,235	223.88	213.61	-10.27	-5%
Ventura	2,457	184.59	184.47	-0.12	0%

Southern Div. Scenario 6 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	99.83	10.79	12%
LA-Duarte	84,464	79.46	94.37	14.90	19%
LA-San Marino	150,230	120.90	143.24	22.34	18%
San Diego	226,970	74.87	71.98	-2.89	-4%
Ventura	230,240	114.50	117.70	3.20	3%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	102.95	11.12	12%
LA-Duarte	63,829	85.46	101.51	16.05	19%
LA-San Marino	125,572	131.69	155.98	24.29	18%
San Diego	178,934	79.75	76.69	-3.06	-4%
Ventura	214,969	117.59	120.82	3.23	3%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	75.95	8.27	12%
LA-Duarte	20,635	60.91	72.25	11.34	19%
LA-San Marino	24,658	65.99	78.39	12.40	19%
San Diego	48,036	56.70	54.43	-2.27	-4%
Ventura	15,271	70.96	73.76	2.80	4%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	248.89	24.15	11%
LA-Duarte	9,687	488.36	576.77	88.41	18%
LA-San Marino	19,054	316.86	372.48	55.61	18%
San Diego	29,695	653.60	553.38	-100.22	-15%
Ventura	18,070	883.02	883.83	0.81	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 6 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	41.08	7.08	21%
LA-Duarte	18,585	31.25	38.88	7.63	24%
LA-San Marino	24,016	34.16	42.64	8.48	25%
San Diego	89,406	38.30	40.28	1.99	5%
Ventura	45,165	31.80	36.61	4.81	15%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	65.11	8.78	16%
LA-Duarte	23,424	47.37	57.28	9.91	21%
LA-San Marino	33,375	52.42	63.72	11.29	22%
San Diego	80,898	65.56	62.61	-2.95	-4%
Ventura	45,466	56.28	60.45	4.17	7%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	90.44	10.36	13%
LA-Duarte	17,784	67.12	79.85	12.73	19%
LA-San Marino	27,979	75.02	89.81	14.79	20%
San Diego	33,283	99.70	94.72	-4.98	-5%
Ventura	43,823	83.31	87.30	3.99	5%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	122.49	12.18	11%
LA-Duarte	10,721	92.55	108.99	16.44	18%
LA-San Marino	19,587	105.02	124.65	19.63	19%
San Diego	12,542	147.73	138.48	-9.25	-6%
Ventura	34,474	117.23	120.66	3.43	3%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	217.19	17.77	9%
LA-Duarte	13,950	203.27	237.82	34.56	17%
LA-San Marino	45,273	252.63	296.30	43.67	17%
San Diego	10,841	285.47	256.52	-28.94	-10%
Ventura	61,312	239.35	239.95	0.60	0%

Southern Div. Scenario 6 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	42.41	7.29	21%
LA-Duarte	14,479	33.33	41.44	8.12	24%
LA-San Marino	19,496	36.15	45.12	8.97	25%
San Diego	71,446	40.14	42.36	2.22	6%
Ventura	40,659	32.59	37.52	4.93	15%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	67.13	9.06	16%
LA-Duarte	17,378	50.44	60.97	10.53	21%
LA-San Marino	25,934	55.74	67.75	12.01	22%
San Diego	61,931	69.33	66.34	-2.99	-4%
Ventura	41,929	57.35	61.60	4.25	7%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	92.74	10.62	13%
LA-Duarte	13,149	71.41	84.94	13.53	19%
LA-San Marino	22,376	79.50	95.24	15.74	20%
San Diego	25,702	105.33	100.25	-5.08	-5%
Ventura	41,018	84.55	88.61	4.06	5%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	124.93	12.44	11%
LA-Duarte	7,870	98.36	115.88	17.53	18%
LA-San Marino	16,239	110.08	130.79	20.71	19%
San Diego	10,249	154.43	144.40	-10.04	-7%
Ventura	32,508	118.72	122.19	3.47	3%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	220.18	18.12	9%
LA-Duarte	10,953	217.53	254.82	37.29	17%
LA-San Marino	41,527	260.54	305.69	45.16	17%
San Diego	9,606	293.38	263.48	-29.90	-10%
Ventura	58,855	241.63	242.24	0.61	0%

Southern Div. Scenario 6 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	32.95	5.74	21%
LA-Duarte	4,106	23.93	29.82	5.89	25%
LA-San Marino	4,520	25.60	31.98	6.37	25%
San Diego	17,960	30.96	32.03	1.07	3%
Ventura	4,506	24.64	28.38	3.74	15%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	50.97	6.85	16%
LA-Duarte	6,046	38.54	46.70	8.16	21%
LA-San Marino	7,441	40.87	49.66	8.78	21%
San Diego	18,967	53.24	50.42	-2.82	-5%
Ventura	3,537	43.61	46.81	3.20	7%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	71.49	8.20	13%
LA-Duarte	4,635	54.95	65.42	10.46	19%
LA-San Marino	5,603	57.13	68.12	11.00	19%
San Diego	7,581	80.63	75.98	-4.64	-6%
Ventura	2,805	65.17	68.09	2.92	4%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	97.96	9.58	11%
LA-Duarte	2,851	76.50	89.95	13.45	18%
LA-San Marino	3,348	80.44	94.86	14.42	18%
San Diego	2,293	117.75	112.04	-5.70	-5%
Ventura	1,966	92.58	95.31	2.73	3%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	189.60	14.60	8%
LA-Duarte	2,997	151.12	175.68	24.56	16%
LA-San Marino	3,746	164.98	192.13	27.15	16%
San Diego	1,235	223.88	202.41	-21.47	-10%
Ventura	2,457	184.59	184.99	0.40	0%

Southern Div. Scenario 7 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	95.70	6.66	7%
LA-Duarte	84,464	79.46	87.77	8.31	10%
LA-San Marino	150,230	120.90	133.34	12.44	10%
San Diego	226,970	74.87	77.25	2.38	3%
Ventura	230,240	114.50	118.52	4.02	4%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	98.70	6.87	7%
LA-Duarte	63,829	85.46	94.51	9.05	11%
LA-San Marino	125,572	131.69	145.11	13.43	10%
San Diego	178,934	79.75	82.32	2.57	3%
Ventura	214,969	117.59	121.63	4.04	3%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	72.74	5.06	7%
LA-Duarte	20,635	60.91	66.92	6.00	10%
LA-San Marino	24,658	65.99	73.37	7.38	11%
San Diego	48,036	56.70	58.36	1.66	3%
Ventura	15,271	70.96	74.66	3.70	5%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	235.12	10.38	5%
LA-Duarte	9,687	488.36	520.69	32.33	7%
LA-San Marino	19,054	316.86	343.47	26.61	8%
San Diego	29,695	653.60	602.09	-51.51	-8%
Ventura	18,070	883.02	877.37	-5.65	-1%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 7 Average Residential Bill by Usage Range

0-5 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,816	34.00	42.52	8.52	25%
LA-Duarte	18,585	31.25	39.75	8.50	27%
LA-San Marino	24,016	34.16	43.95	9.79	29%
San Diego	89,406	38.30	43.82	5.52	14%
Ventura	45,165	31.80	38.60	6.80	21%

6-10 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	17,085	56.32	64.47	8.14	14%
LA-Duarte	23,424	47.37	55.10	7.73	16%
LA-San Marino	33,375	52.42	62.17	9.75	19%
San Diego	80,898	65.56	67.59	2.03	3%
Ventura	45,466	56.28	61.99	5.71	10%

11-15 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	14,358	80.08	87.40	7.32	9%
LA-Duarte	17,784	67.12	74.78	7.66	11%
LA-San Marino	27,979	75.02	85.74	10.72	14%
San Diego	33,283	99.70	100.80	1.10	1%
Ventura	43,823	83.31	88.74	5.43	7%

16-20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	9,111	110.30	116.19	5.89	5%
LA-Duarte	10,721	92.55	99.97	7.43	8%
LA-San Marino	19,587	105.02	117.07	12.05	11%
San Diego	12,542	147.73	146.36	-1.37	-1%
Ventura	34,474	117.23	121.60	4.38	4%

>20 CCF	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	11,863	199.41	201.41	2.00	1%
LA-Duarte	13,950	203.27	213.79	10.52	5%
LA-San Marino	45,273	252.63	269.68	17.04	7%
San Diego	10,841	285.47	272.81	-12.66	-4%
Ventura	61,312	239.35	238.86	-0.49	0%

Southern Div. Scenario 7 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	43.91	8.80	25%
LA-Duarte	14,479	33.33	42.45	9.13	27%
LA-San Marino	19,496	36.15	46.58	10.43	29%
San Diego	71,446	40.14	46.07	5.93	15%
Ventura	40,659	32.59	39.56	6.97	21%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	66.50	8.43	15%
LA-Duarte	17,378	50.44	58.70	8.26	16%
LA-San Marino	25,934	55.74	66.22	10.48	19%
San Diego	61,931	69.33	71.61	2.28	3%
Ventura	41,929	57.35	63.17	5.82	10%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	89.64	7.52	9%
LA-Duarte	13,149	71.41	79.64	8.23	12%
LA-San Marino	22,376	79.50	91.13	11.63	15%
San Diego	25,702	105.33	106.69	1.36	1%
Ventura	41,018	84.55	90.08	5.53	7%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	118.54	6.05	5%
LA-Duarte	7,870	98.36	106.41	8.05	8%
LA-San Marino	16,239	110.08	123.07	12.98	12%
San Diego	10,249	154.43	152.98	-1.45	-1%
Ventura	32,508	118.72	123.14	4.43	4%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	204.31	2.25	1%
LA-Duarte	10,953	217.53	229.46	11.93	5%
LA-San Marino	41,527	260.54	278.35	17.82	7%
San Diego	9,606	293.38	280.45	-12.93	-4%
Ventura	58,855	241.63	241.14	-0.49	0%

Southern Div. Scenario 7 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	34.03	6.82	25%
LA-Duarte	4,106	23.93	30.23	6.30	26%
LA-San Marino	4,520	25.60	32.64	7.03	27%
San Diego	17,960	30.96	34.89	3.92	13%
Ventura	4,506	24.64	29.93	5.29	21%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	50.28	6.16	14%
LA-Duarte	6,046	38.54	44.74	6.20	16%
LA-San Marino	7,441	40.87	48.05	7.18	18%
San Diego	18,967	53.24	54.46	1.22	2%
Ventura	3,537	43.61	47.99	4.38	10%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	68.95	5.65	9%
LA-Duarte	4,635	54.95	61.00	6.05	11%
LA-San Marino	5,603	57.13	64.21	7.09	12%
San Diego	7,581	80.63	80.82	0.19	0%
Ventura	2,805	65.17	69.12	3.95	6%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	92.61	4.23	5%
LA-Duarte	2,851	76.50	82.22	5.72	7%
LA-San Marino	3,348	80.44	87.99	7.55	9%
San Diego	2,293	117.75	116.77	-0.98	-1%
Ventura	1,966	92.58	96.13	3.55	4%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	174.67	-0.33	0%
LA-Duarte	2,997	151.12	156.51	5.39	4%
LA-San Marino	3,746	164.98	173.46	8.48	5%
San Diego	1,235	223.88	213.40	-10.48	-5%
Ventura	2,457	184.59	184.22	-0.36	0%

Southern Div. Scenario 8 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	100.70	11.66	13%
LA-Duarte	84,464	79.46	95.02	15.55	20%
LA-San Marino	150,230	120.90	144.22	23.31	19%
San Diego	226,970	74.87	73.71	-1.16	-2%
Ventura	230,240	114.50	118.90	4.41	4%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	103.85	12.02	13%
LA-Duarte	63,829	85.46	102.26	16.80	20%
LA-San Marino	125,572	131.69	156.99	25.31	19%
San Diego	178,934	79.75	78.55	-1.20	-2%
Ventura	214,969	117.59	122.03	4.44	4%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	76.60	8.92	13%
LA-Duarte	20,635	60.91	72.61	11.69	19%
LA-San Marino	24,658	65.99	79.15	13.15	20%
San Diego	48,036	56.70	55.72	-0.98	-2%
Ventura	15,271	70.96	74.87	3.91	6%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	248.87	24.13	11%
LA-Duarte	9,687	488.36	573.03	84.68	17%
LA-San Marino	19,054	316.86	372.98	56.11	18%
San Diego	29,695	653.60	552.40	-101.19	-15%
Ventura	18,070	883.02	882.04	-0.98	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 8 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	43.45	9.45	28%
LA-Duarte	18,585	31.25	41.11	9.86	32%
LA-San Marino	24,016	34.16	45.27	11.11	33%
San Diego	89,406	38.30	42.37	4.08	11%
Ventura	45,165	31.80	38.67	6.87	22%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	66.99	10.67	19%
LA-Duarte	23,424	47.37	58.70	11.33	24%
LA-San Marino	33,375	52.42	65.75	13.33	25%
San Diego	80,898	65.56	64.27	-1.28	-2%
Ventura	45,466	56.28	62.17	5.90	10%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	91.68	11.59	14%
LA-Duarte	17,784	67.12	80.66	13.54	20%
LA-San Marino	27,979	75.02	91.57	16.54	22%
San Diego	33,283	99.70	96.26	-3.44	-3%
Ventura	43,823	83.31	88.97	5.66	7%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	122.76	12.46	11%
LA-Duarte	10,721	92.55	108.94	16.39	18%
LA-San Marino	19,587	105.02	126.01	20.99	20%
San Diego	12,542	147.73	139.89	-7.83	-5%
Ventura	34,474	117.23	121.96	4.74	4%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	214.72	15.31	8%
LA-Duarte	13,950	203.27	235.44	32.17	16%
LA-San Marino	45,273	252.63	294.96	42.33	17%
San Diego	10,841	285.47	256.84	-28.63	-10%
Ventura	61,312	239.35	239.75	0.40	0%

Southern Div. Scenario 8 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	44.86	9.75	28%
LA-Duarte	14,479	33.33	43.85	10.53	32%
LA-San Marino	19,496	36.15	47.93	11.78	33%
San Diego	71,446	40.14	44.58	4.44	11%
Ventura	40,659	32.59	39.63	7.04	22%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	69.09	11.02	19%
LA-Duarte	17,378	50.44	62.49	12.05	24%
LA-San Marino	25,934	55.74	69.97	14.23	26%
San Diego	61,931	69.33	68.13	-1.20	-2%
Ventura	41,929	57.35	63.36	6.01	10%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	94.02	11.89	14%
LA-Duarte	13,149	71.41	85.84	14.43	20%
LA-San Marino	22,376	79.50	97.21	17.71	22%
San Diego	25,702	105.33	101.92	-3.41	-3%
Ventura	41,018	84.55	90.32	5.77	7%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	125.22	12.74	11%
LA-Duarte	7,870	98.36	115.89	17.53	18%
LA-San Marino	16,239	110.08	132.35	22.26	20%
San Diego	10,249	154.43	145.89	-8.54	-6%
Ventura	32,508	118.72	123.51	4.79	4%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	217.76	15.70	8%
LA-Duarte	10,953	217.53	252.50	34.97	16%
LA-San Marino	41,527	260.54	304.40	43.86	17%
San Diego	9,606	293.38	263.90	-29.49	-10%
Ventura	58,855	241.63	242.04	0.41	0%

Southern Div. Scenario 8 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	34.84	7.63	28%
LA-Duarte	4,106	23.93	31.43	7.50	31%
LA-San Marino	4,520	25.60	33.81	8.21	32%
San Diego	17,960	30.96	33.59	2.63	8%
Ventura	4,506	24.64	29.98	5.35	22%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	52.36	8.23	19%
LA-Duarte	6,046	38.54	47.79	9.25	24%
LA-San Marino	7,441	40.87	51.06	10.19	25%
San Diego	18,967	53.24	51.67	-1.56	-3%
Ventura	3,537	43.61	48.13	4.53	10%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	72.41	9.11	14%
LA-Duarte	4,635	54.95	65.97	11.02	20%
LA-San Marino	5,603	57.13	69.03	11.91	21%
San Diego	7,581	80.63	77.09	-3.54	-4%
Ventura	2,805	65.17	69.31	4.14	6%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	98.00	9.62	11%
LA-Duarte	2,851	76.50	89.75	13.25	17%
LA-San Marino	3,348	80.44	95.28	14.84	18%
San Diego	2,293	117.75	113.07	-4.68	-4%
Ventura	1,966	92.58	96.37	3.79	4%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	186.72	11.72	7%
LA-Duarte	2,997	151.12	173.06	21.94	15%
LA-San Marino	3,746	164.98	190.37	25.38	15%
San Diego	1,235	223.88	201.92	-21.96	-10%
Ventura	2,457	184.59	184.83	0.24	0%

Southern Div. Scenario 9 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	96.54	7.50	8%
LA-Duarte	84,464	79.46	88.36	8.89	11%
LA-San Marino	150,230	120.90	134.20	13.30	11%
San Diego	226,970	74.87	79.03	4.16	6%
Ventura	230,240	114.50	119.67	5.18	5%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	99.57	7.74	8%
LA-Duarte	63,829	85.46	95.19	9.73	11%
LA-San Marino	125,572	131.69	146.01	14.32	11%
San Diego	178,934	79.75	84.23	4.48	6%
Ventura	214,969	117.59	122.79	5.20	4%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	73.37	5.69	8%
LA-Duarte	20,635	60.91	67.22	6.30	10%
LA-San Marino	24,658	65.99	74.07	8.07	12%
San Diego	48,036	56.70	59.68	2.98	5%
Ventura	15,271	70.96	75.75	4.79	7%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	235.03	10.28	5%
LA-Duarte	9,687	488.36	516.56	28.20	6%
LA-San Marino	19,054	316.86	343.63	26.77	8%
San Diego	29,695	653.60	601.57	-52.03	-8%
Ventura	18,070	883.02	875.15	-7.87	-1%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 9 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	44.89	10.89	32%
LA-Duarte	18,585	31.25	41.97	10.72	34%
LA-San Marino	24,016	34.16	46.57	12.41	36%
San Diego	89,406	38.30	45.93	7.63	20%
Ventura	45,165	31.80	40.66	8.86	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	66.34	10.02	18%
LA-Duarte	23,424	47.37	56.48	9.11	19%
LA-San Marino	33,375	52.42	64.17	11.75	22%
San Diego	80,898	65.56	69.27	3.71	6%
Ventura	45,466	56.28	63.69	7.42	13%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	88.61	8.53	11%
LA-Duarte	17,784	67.12	75.53	8.41	13%
LA-San Marino	27,979	75.02	87.43	12.41	17%
San Diego	33,283	99.70	102.40	2.70	3%
Ventura	43,823	83.31	90.38	7.07	8%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	116.43	6.12	6%
LA-Duarte	10,721	92.55	99.84	7.30	8%
LA-San Marino	19,587	105.02	118.35	13.33	13%
San Diego	12,542	147.73	147.93	0.20	0%
Ventura	34,474	117.23	122.88	5.65	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	198.87	-0.54	0%
LA-Duarte	13,950	203.27	211.20	7.93	4%
LA-San Marino	45,273	252.63	268.08	15.45	6%
San Diego	10,841	285.47	273.39	-12.07	-4%
Ventura	61,312	239.35	238.53	-0.82	0%

Southern Div. Scenario 9 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	46.36	11.24	32%
LA-Duarte	14,479	33.33	44.85	11.52	35%
LA-San Marino	19,496	36.15	49.38	13.23	37%
San Diego	71,446	40.14	48.31	8.17	20%
Ventura	40,659	32.59	41.67	9.08	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	68.45	10.37	18%
LA-Duarte	17,378	50.44	60.19	9.75	19%
LA-San Marino	25,934	55.74	68.40	12.67	23%
San Diego	61,931	69.33	73.42	4.09	6%
Ventura	41,929	57.35	64.91	7.56	13%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	90.89	8.77	11%
LA-Duarte	13,149	71.41	80.48	9.07	13%
LA-San Marino	22,376	79.50	93.03	13.53	17%
San Diego	25,702	105.33	108.43	3.11	3%
Ventura	41,018	84.55	91.75	7.20	9%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	118.79	6.31	6%
LA-Duarte	7,870	98.36	106.32	7.97	8%
LA-San Marino	16,239	110.08	124.53	14.45	13%
San Diego	10,249	154.43	154.64	0.21	0%
Ventura	32,508	118.72	124.43	5.72	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	201.82	-0.24	0%
LA-Duarte	10,953	217.53	226.92	9.39	4%
LA-San Marino	41,527	260.54	276.79	16.25	6%
San Diego	9,606	293.38	281.14	-12.25	-4%
Ventura	58,855	241.63	240.81	-0.83	0%

Southern Div. Scenario 9 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	35.91	8.71	32%
LA-Duarte	4,106	23.93	31.82	7.89	33%
LA-San Marino	4,520	25.60	34.46	8.86	35%
San Diego	17,960	30.96	36.46	5.50	18%
Ventura	4,506	24.64	31.53	6.89	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	51.66	7.54	17%
LA-Duarte	6,046	38.54	45.80	7.27	19%
LA-San Marino	7,441	40.87	49.43	8.55	21%
San Diego	18,967	53.24	55.73	2.49	5%
Ventura	3,537	43.61	49.29	5.68	13%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	69.85	6.55	10%
LA-Duarte	4,635	54.95	61.50	6.55	12%
LA-San Marino	5,603	57.13	65.07	7.94	14%
San Diego	7,581	80.63	81.94	1.31	2%
Ventura	2,805	65.17	70.31	5.14	8%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	92.62	4.24	5%
LA-Duarte	2,851	76.50	81.96	5.46	7%
LA-San Marino	3,348	80.44	88.35	7.91	10%
San Diego	2,293	117.75	117.94	0.20	0%
Ventura	1,966	92.58	97.22	4.64	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	171.72	-3.27	-2%
LA-Duarte	2,997	151.12	153.72	2.60	2%
LA-San Marino	3,746	164.98	171.49	6.51	4%
San Diego	1,235	223.88	213.17	-10.72	-5%
Ventura	2,457	184.59	183.95	-0.64	0%

Southern Div. Scenario 10 Average Bill

Residential - All	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	67,233	89.04	101.62	12.58	14%
LA-Duarte	84,464	79.46	95.71	16.24	20%
LA-San Marino	150,230	120.90	145.24	24.34	20%
San Diego	226,970	74.87	75.45	0.58	1%
Ventura	230,240	114.50	120.11	5.61	5%

Residential - Non-CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	59,462	91.83	104.80	12.97	14%
LA-Duarte	63,829	85.46	103.05	17.59	21%
LA-San Marino	125,572	131.69	158.07	26.38	20%
San Diego	178,934	79.75	80.40	0.65	1%
Ventura	214,969	117.59	123.25	5.66	5%

Residential - CAP	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,771	67.68	77.28	9.60	14%
LA-Duarte	20,635	60.91	72.99	12.08	20%
LA-San Marino	24,658	65.99	79.93	13.94	21%
San Diego	48,036	56.70	57.00	0.31	1%
Ventura	15,271	70.96	75.99	5.03	7%

Non-Residential	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	7,533	224.75	248.99	24.24	11%
LA-Duarte	9,687	488.36	569.58	81.23	17%
LA-San Marino	19,054	316.86	373.61	56.75	18%
San Diego	29,695	653.60	551.51	-102.09	-16%
Ventura	18,070	883.02	880.43	-2.58	0%

Private Fire Service	Bills	Current	New	Difference	% Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%

Southern Div. Scenario 10 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	45.83	11.83	35%
LA-Duarte	18,585	31.25	43.34	12.09	39%
LA-San Marino	24,016	34.16	47.91	13.75	40%
San Diego	89,406	38.30	44.46	6.17	16%
Ventura	45,165	31.80	40.73	8.94	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	68.91	12.58	22%
LA-Duarte	23,424	47.37	60.13	12.76	27%
LA-San Marino	33,375	52.42	67.80	15.38	29%
San Diego	80,898	65.56	65.94	0.38	1%
Ventura	45,466	56.28	63.90	7.63	14%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	92.95	12.87	16%
LA-Duarte	17,784	67.12	81.50	14.38	21%
LA-San Marino	27,979	75.02	93.35	18.33	24%
San Diego	33,283	99.70	97.80	-1.90	-2%
Ventura	43,823	83.31	90.64	7.33	9%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	123.10	12.80	12%
LA-Duarte	10,721	92.55	108.93	16.38	18%
LA-San Marino	19,587	105.02	127.41	22.40	21%
San Diego	12,542	147.73	141.28	-6.44	-4%
Ventura	34,474	117.23	123.28	6.05	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	212.39	12.98	7%
LA-Duarte	13,950	203.27	233.16	29.89	15%
LA-San Marino	45,273	252.63	293.75	41.12	16%
San Diego	10,841	285.47	257.14	-28.33	-10%
Ventura	61,312	239.35	239.55	0.20	0%

Southern Div. Scenario 10 Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,730	35.11	47.32	12.21	35%
LA-Duarte	14,479	33.33	46.27	12.94	39%
LA-San Marino	19,496	36.15	50.75	14.61	40%
San Diego	71,446	40.14	46.80	6.66	17%
Ventura	40,659	32.59	41.75	9.16	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	14,941	58.07	71.08	13.01	22%
LA-Duarte	17,378	50.44	64.04	13.60	27%
LA-San Marino	25,934	55.74	72.20	16.46	30%
San Diego	61,931	69.33	69.93	0.60	1%
Ventura	41,929	57.35	65.12	7.78	14%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	12,803	82.12	95.33	13.21	16%
LA-Duarte	13,149	71.41	86.77	15.36	22%
LA-San Marino	22,376	79.50	99.20	19.70	25%
San Diego	25,702	105.33	103.59	-1.74	-2%
Ventura	41,018	84.55	92.02	7.47	9%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	8,287	112.48	125.58	13.10	12%
LA-Duarte	7,870	98.36	115.93	17.58	18%
LA-San Marino	16,239	110.08	133.95	23.86	22%
San Diego	10,249	154.43	147.37	-7.06	-5%
Ventura	32,508	118.72	124.84	6.12	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	10,701	202.06	215.48	13.42	7%
LA-Duarte	10,953	217.53	250.30	32.76	15%
LA-San Marino	41,527	260.54	303.23	42.69	16%
San Diego	9,606	293.38	264.31	-29.08	-10%
Ventura	58,855	241.63	241.84	0.21	0%

Southern Div. Scenario 10 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	36.73	9.52	35%
LA-Duarte	4,106	23.93	33.04	9.10	38%
LA-San Marino	4,520	25.60	35.65	10.04	39%
San Diego	17,960	30.96	35.15	4.19	14%
Ventura	4,506	24.64	31.59	6.95	28%

					%
6-10 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	53.77	9.65	22%
LA-Duarte	6,046	38.54	48.90	10.36	27%
LA-San Marino	7,441	40.87	52.48	11.60	28%
San Diego	18,967	53.24	52.93	-0.31	-1%
Ventura	3,537	43.61	49.46	5.85	13%

					%
11-15 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	73.36	10.06	16%
LA-Duarte	4,635	54.95	66.55	11.60	21%
LA-San Marino	5,603	57.13	69.97	12.84	22%
San Diego	7,581	80.63	78.19	-2.44	-3%
Ventura	2,805	65.17	70.53	5.36	8%

					%
16-20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	824	88.38	98.09	9.71	11%
LA-Duarte	2,851	76.50	89.58	13.08	17%
LA-San Marino	3,348	80.44	95.73	15.29	19%
San Diego	2,293	117.75	114.06	-3.68	-3%
Ventura	1,966	92.58	97.46	4.88	5%

					%
>20 CCF	Bills	Current	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	183.96	8.97	5%
LA-Duarte	2,997	151.12	170.52	19.40	13%
LA-San Marino	3,746	164.98	188.68	23.69	14%
San Diego	1,235	223.88	201.41	-22.48	-10%
Ventura	2,457	184.59	184.65	0.06	0%

Southern Div. Scenario 11

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	67,233	89.04	89.87	0.83	1%
LA-Duarte	84,464	79.46	83.62	4.15	5%
LA-San Marino	150,230	120.90	127.11	6.21	5%
San Diego	226,970	74.87	78.06	3.19	4%
Ventura	230,240	114.50	116.44	1.94	2%

					%
Residential - Non-CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	59,462	91.83	92.70	0.86	1%
LA-Duarte	63,829	85.46	90.02	4.56	5%
LA-San Marino	125,572	131.69	138.36	6.67	5%
San Diego	178,934	79.75	83.17	3.42	4%
Ventura	214,969	117.59	119.52	1.93	2%

					%
Residential - CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,771	67.68	68.27	0.59	1%
LA-Duarte	20,635	60.91	63.81	2.90	5%
LA-San Marino	24,658	65.99	69.83	3.84	6%
San Diego	48,036	56.70	59.01	2.31	4%
Ventura	15,271	70.96	73.06	2.11	3%

					%
Non-Residential	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,533	224.75	221.50	-3.24	-1%
LA-Duarte	9,687	488.36	499.11	10.76	2%
LA-San Marino	19,054	316.86	328.73	11.86	4%
San Diego	29,695	653.60	639.24	-14.36	-2%
Ventura	18,070	883.02	868.46	-14.56	-2%

					%
Private Fire Service	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 11 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	39.23	5.23	15%
LA-Duarte	18,585	31.25	36.87	5.62	18%
LA-San Marino	24,016	34.16	40.69	6.52	19%
San Diego	89,406	38.30	42.77	4.47	12%
Ventura	45,165	31.80	36.39	4.59	14%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	60.07	3.75	7%
LA-Duarte	23,424	47.37	51.94	4.57	10%
LA-San Marino	33,375	52.42	58.41	5.98	11%
San Diego	80,898	65.56	68.49	2.93	4%
Ventura	45,466	56.28	59.84	3.56	6%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	81.93	1.84	2%
LA-Duarte	17,784	67.12	71.13	4.01	6%
LA-San Marino	27,979	75.02	81.17	6.15	8%
San Diego	33,283	99.70	102.27	2.57	3%
Ventura	43,823	83.31	86.55	3.24	4%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	109.40	-0.90	-1%
LA-Duarte	10,721	92.55	95.71	3.16	3%
LA-San Marino	19,587	105.02	111.40	6.38	6%
San Diego	12,542	147.73	149.58	1.85	1%
Ventura	34,474	117.23	119.49	2.27	2%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	190.66	-8.75	-4%
LA-Duarte	13,950	203.27	205.71	2.45	1%
LA-San Marino	45,273	252.63	258.79	6.16	2%
San Diego	10,841	285.47	283.38	-2.08	-1%
Ventura	61,312	239.35	237.03	-2.31	-1%

Southern Div. Scenario 11 Average Non-CAP Residential Bill by Usage Range

0-5 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,730	35.11	40.52	5.41	15%
LA-Duarte	14,479	33.33	39.37	6.04	18%
LA-San Marino	19,496	36.15	43.11	6.96	19%
San Diego	71,446	40.14	44.91	4.77	12%
Ventura	40,659	32.59	37.30	4.70	14%

6-10 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	14,941	58.07	61.97	3.90	7%
LA-Duarte	17,378	50.44	55.34	4.90	10%
LA-San Marino	25,934	55.74	62.20	6.46	12%
San Diego	61,931	69.33	72.51	3.18	5%
Ventura	41,929	57.35	60.98	3.63	6%

11-15 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,803	82.12	84.03	1.91	2%
LA-Duarte	13,149	71.41	75.74	4.33	6%
LA-San Marino	22,376	79.50	86.23	6.73	8%
San Diego	25,702	105.33	108.17	2.84	3%
Ventura	41,018	84.55	87.85	3.30	4%

16-20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	8,287	112.48	111.61	-0.88	-1%
LA-Duarte	7,870	98.36	101.83	3.47	4%
LA-San Marino	16,239	110.08	117.04	6.95	6%
San Diego	10,249	154.43	156.46	2.03	1%
Ventura	32,508	118.72	121.00	2.29	2%

>20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	10,701	202.06	193.38	-8.68	-4%
LA-Duarte	10,953	217.53	220.65	3.11	1%
LA-San Marino	41,527	260.54	267.07	6.53	3%
San Diego	9,606	293.38	291.36	-2.02	-1%
Ventura	58,855	241.63	239.29	-2.35	-1%

Southern Div. Scenario 11 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	31.35	4.14	15%
LA-Duarte	4,106	23.93	28.05	4.12	17%
LA-San Marino	4,520	25.60	30.24	4.64	18%
San Diego	17,960	30.96	34.25	3.29	11%
Ventura	4,506	24.64	28.20	3.56	14%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	46.83	2.71	6%
LA-Duarte	6,046	38.54	42.17	3.63	9%
LA-San Marino	7,441	40.87	45.20	4.32	11%
San Diego	18,967	53.24	55.37	2.13	4%
Ventura	3,537	43.61	46.32	2.72	6%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	64.60	1.30	2%
LA-Duarte	4,635	54.95	58.04	3.09	6%
LA-San Marino	5,603	57.13	60.97	3.85	7%
San Diego	7,581	80.63	82.26	1.63	2%
Ventura	2,805	65.17	67.48	2.31	4%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	824	88.38	87.21	-1.17	-1%
LA-Duarte	2,851	76.50	78.79	2.29	3%
LA-San Marino	3,348	80.44	84.07	3.63	5%
San Diego	2,293	117.75	118.84	1.09	1%
Ventura	1,966	92.58	94.54	1.96	2%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	165.59	-9.41	-5%
LA-Duarte	2,997	151.12	151.14	0.02	0%
LA-San Marino	3,746	164.98	167.06	2.08	1%
San Diego	1,235	223.88	221.33	-2.56	-1%
Ventura	2,457	184.59	183.03	-1.56	-1%

Southern Div. Scenario 12

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	67,233	89.04	89.45	0.41	0%
LA-Duarte	84,464	79.46	82.86	3.40	4%
LA-San Marino	150,230	120.90	126.55	5.64	5%
San Diego	226,970	74.87	77.60	2.73	4%
Ventura	230,240	114.50	116.29	1.79	2%

					%
Residential - Non-CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	59,462	91.83	92.67	0.84	1%
LA-Duarte	63,829	85.46	89.99	4.53	5%
LA-San Marino	125,572	131.69	138.32	6.63	5%
San Diego	178,934	79.75	83.16	3.41	4%
Ventura	214,969	117.59	119.50	1.91	2%

					%
Residential - CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,771	67.68	64.82	-2.86	-4%
LA-Duarte	20,635	60.91	60.81	-0.11	0%
LA-San Marino	24,658	65.99	66.60	0.60	1%
San Diego	48,036	56.70	56.88	0.18	0%
Ventura	15,271	70.96	71.01	0.05	0%

					%
Non-Residential	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,533	224.75	221.43	-3.32	-1%
LA-Duarte	9,687	488.36	498.94	10.58	2%
LA-San Marino	19,054	316.86	328.63	11.76	4%
San Diego	29,695	653.60	639.14	-14.46	-2%
Ventura	18,070	883.02	868.25	-14.76	-2%

					%
Private Fire Service	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 12 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	38.95	4.95	15%
LA-Duarte	18,585	31.25	36.49	5.24	17%
LA-San Marino	24,016	34.16	40.34	6.18	18%
San Diego	89,406	38.30	42.44	4.14	11%
Ventura	45,165	31.80	36.24	4.44	14%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	59.70	3.38	6%
LA-Duarte	23,424	47.37	51.30	3.93	8%
LA-San Marino	33,375	52.42	57.81	5.39	10%
San Diego	80,898	65.56	67.93	2.38	4%
Ventura	45,466	56.28	59.67	3.39	6%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	81.48	1.39	2%
LA-Duarte	17,784	67.12	70.26	3.14	5%
LA-San Marino	27,979	75.02	80.47	5.45	7%
San Diego	33,283	99.70	101.68	1.98	2%
Ventura	43,823	83.31	86.38	3.07	4%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	108.91	-1.40	-1%
LA-Duarte	10,721	92.55	94.59	2.04	2%
LA-San Marino	19,587	105.02	110.63	5.61	5%
San Diego	12,542	147.73	149.13	1.40	1%
Ventura	34,474	117.23	119.35	2.13	2%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	190.06	-9.35	-5%
LA-Duarte	13,950	203.27	204.70	1.44	1%
LA-San Marino	45,273	252.63	258.30	5.67	2%
San Diego	10,841	285.47	283.05	-2.42	-1%
Ventura	61,312	239.35	236.89	-2.46	-1%

Southern Div. Scenario 12 Average Non-CAP Residential Bill by Usage Range

0-5 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,730	35.11	40.52	5.40	15%
LA-Duarte	14,479	33.33	39.36	6.04	18%
LA-San Marino	19,496	36.15	43.10	6.96	19%
San Diego	71,446	40.14	44.91	4.77	12%
Ventura	40,659	32.59	37.29	4.70	14%

6-10 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	14,941	58.07	61.96	3.88	7%
LA-Duarte	17,378	50.44	55.33	4.89	10%
LA-San Marino	25,934	55.74	62.19	6.45	12%
San Diego	61,931	69.33	72.50	3.17	5%
Ventura	41,929	57.35	60.97	3.62	6%

11-15 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,803	82.12	84.01	1.88	2%
LA-Duarte	13,149	71.41	75.72	4.31	6%
LA-San Marino	22,376	79.50	86.21	6.71	8%
San Diego	25,702	105.33	108.16	2.83	3%
Ventura	41,018	84.55	87.84	3.29	4%

16-20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	8,287	112.48	111.57	-0.91	-1%
LA-Duarte	7,870	98.36	101.80	3.44	3%
LA-San Marino	16,239	110.08	117.01	6.92	6%
San Diego	10,249	154.43	156.45	2.01	1%
Ventura	32,508	118.72	120.99	2.27	2%

>20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	10,701	202.06	193.31	-8.75	-4%
LA-Duarte	10,953	217.53	220.57	3.04	1%
LA-San Marino	41,527	260.54	266.98	6.44	2%
San Diego	9,606	293.38	291.33	-2.05	-1%
Ventura	58,855	241.63	239.25	-2.38	-1%

Southern Div. Scenario 12 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	29.43	2.22	8%
LA-Duarte	4,106	23.93	26.38	2.44	10%
LA-San Marino	4,520	25.60	28.44	2.84	11%
San Diego	17,960	30.96	32.61	1.64	5%
Ventura	4,506	24.64	26.74	2.11	9%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	43.97	-0.16	0%
LA-Duarte	6,046	38.54	39.71	1.17	3%
LA-San Marino	7,441	40.87	42.57	1.70	4%
San Diego	18,967	53.24	53.02	-0.22	0%
Ventura	3,537	43.61	44.23	0.62	1%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	60.66	-2.64	-4%
LA-Duarte	4,635	54.95	54.77	-0.18	0%
LA-San Marino	5,603	57.13	57.57	0.44	1%
San Diego	7,581	80.63	79.69	-0.94	-1%
Ventura	2,805	65.17	65.11	-0.06	0%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	824	88.38	82.12	-6.26	-7%
LA-Duarte	2,851	76.50	74.68	-1.82	-2%
LA-San Marino	3,348	80.44	79.71	-0.73	-1%
San Diego	2,293	117.75	116.41	-1.33	-1%
Ventura	1,966	92.58	92.32	-0.26	0%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	160.13	-14.87	-8%
LA-Duarte	2,997	151.12	146.71	-4.41	-3%
LA-San Marino	3,746	164.98	162.14	-2.84	-2%
San Diego	1,235	223.88	218.65	-5.24	-2%
Ventura	2,457	184.59	180.41	-4.17	-2%

Southern Div. Scenario 13

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	67,233	89.04	89.04	0.00	0%
LA-Duarte	84,464	79.46	82.49	3.03	4%
LA-San Marino	150,230	120.90	125.99	5.09	4%
San Diego	226,970	74.87	76.95	2.08	3%
Ventura	230,240	114.50	117.57	3.07	3%

					%
Residential - Non-CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	59,462	91.83	92.25	0.42	0%
LA-Duarte	63,829	85.46	89.60	4.14	5%
LA-San Marino	125,572	131.69	137.72	6.03	5%
San Diego	178,934	79.75	82.47	2.72	3%
Ventura	214,969	117.59	120.83	3.24	3%

					%
Residential - CAP	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,771	67.68	64.48	-3.21	-5%
LA-Duarte	20,635	60.91	60.49	-0.42	-1%
LA-San Marino	24,658	65.99	66.27	0.28	0%
San Diego	48,036	56.70	56.38	-0.32	-1%
Ventura	15,271	70.96	71.64	0.68	1%

					%
Non-Residential	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	7,533	224.75	220.32	-4.43	-2%
LA-Duarte	9,687	488.36	496.30	7.95	2%
LA-San Marino	19,054	316.86	327.13	10.27	3%
San Diego	29,695	653.60	629.84	-23.76	-4%
Ventura	18,070	883.02	883.96	0.94	0%

					%
Private Fire Service	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	418	49.36	49.36	0.00	0%
LA-Duarte	1,639	49.36	49.36	0.00	0%
LA-San Marino	2,199	49.36	49.36	0.00	0%
San Diego	4,049	44.58	44.58	0.00	0%
Ventura	4,004	47.88	47.88	0.00	0%

Southern Div. Scenario 13 Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,816	34.00	38.88	4.88	14%
LA-Duarte	18,585	31.25	36.42	5.17	17%
LA-San Marino	24,016	34.16	40.27	6.11	18%
San Diego	89,406	38.30	42.17	3.87	10%
Ventura	45,165	31.80	36.46	4.66	15%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	17,085	56.32	59.49	3.17	6%
LA-Duarte	23,424	47.37	51.11	3.74	8%
LA-San Marino	33,375	52.42	57.63	5.20	10%
San Diego	80,898	65.56	67.28	1.72	3%
Ventura	45,466	56.28	60.28	4.01	7%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	14,358	80.08	81.13	1.05	1%
LA-Duarte	17,784	67.12	69.96	2.83	4%
LA-San Marino	27,979	75.02	80.17	5.15	7%
San Diego	33,283	99.70	100.90	1.20	1%
Ventura	43,823	83.31	87.15	3.84	5%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	9,111	110.30	108.37	-1.93	-2%
LA-Duarte	10,721	92.55	94.13	1.58	2%
LA-San Marino	19,587	105.02	110.18	5.16	5%
San Diego	12,542	147.73	147.94	0.21	0%
Ventura	34,474	117.23	120.53	3.30	3%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	11,863	199.41	188.98	-10.43	-5%
LA-Duarte	13,950	203.27	203.60	0.33	0%
LA-San Marino	45,273	252.63	257.02	4.39	2%
San Diego	10,841	285.47	280.26	-5.21	-2%
Ventura	61,312	239.35	239.86	0.51	0%

Southern Div. Scenario 13 Average Non-CAP Residential Bill by Usage Range

0-5 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,730	35.11	40.44	5.33	15%
LA-Duarte	14,479	33.33	39.29	5.97	18%
LA-San Marino	19,496	36.15	43.03	6.89	19%
San Diego	71,446	40.14	44.63	4.49	11%
Ventura	40,659	32.59	37.52	4.93	15%

6-10 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	14,941	58.07	61.75	3.67	6%
LA-Duarte	17,378	50.44	55.14	4.69	9%
LA-San Marino	25,934	55.74	62.00	6.26	11%
San Diego	61,931	69.33	71.82	2.49	4%
Ventura	41,929	57.35	61.60	4.26	7%

11-15 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	12,803	82.12	83.65	1.53	2%
LA-Duarte	13,149	71.41	75.41	4.00	6%
LA-San Marino	22,376	79.50	85.90	6.40	8%
San Diego	25,702	105.33	107.36	2.03	2%
Ventura	41,018	84.55	88.62	4.07	5%

16-20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	8,287	112.48	111.03	-1.45	-1%
LA-Duarte	7,870	98.36	101.32	2.96	3%
LA-San Marino	16,239	110.08	116.54	6.45	6%
San Diego	10,249	154.43	155.14	0.71	0%
Ventura	32,508	118.72	122.20	3.48	3%

>20 CCF	Bills	Baseline	New	Difference	% Difference
LA-Baldwin Hills	10,701	202.06	192.22	-9.84	-5%
LA-Duarte	10,953	217.53	219.41	1.87	1%
LA-San Marino	41,527	260.54	265.66	5.13	2%
San Diego	9,606	293.38	288.41	-4.97	-2%
Ventura	58,855	241.63	242.27	0.63	0%

Southern Div. Scenario 13 Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,086	27.21	29.34	2.13	8%
LA-Duarte	4,106	23.93	26.30	2.36	10%
LA-San Marino	4,520	25.60	28.36	2.75	11%
San Diego	17,960	30.96	32.35	1.39	4%
Ventura	4,506	24.64	26.90	2.27	9%

					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	2,144	44.13	43.77	-0.35	-1%
LA-Duarte	6,046	38.54	39.53	0.99	3%
LA-San Marino	7,441	40.87	42.39	1.52	4%
San Diego	18,967	53.24	52.47	-0.77	-1%
Ventura	3,537	43.61	44.68	1.07	2%

					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,555	63.30	60.34	-2.95	-5%
LA-Duarte	4,635	54.95	54.49	-0.47	-1%
LA-San Marino	5,603	57.13	57.29	0.16	0%
San Diego	7,581	80.63	79.02	-1.61	-2%
Ventura	2,805	65.17	65.69	0.52	1%

					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	824	88.38	81.64	-6.74	-8%
LA-Duarte	2,851	76.50	74.27	-2.23	-3%
LA-San Marino	3,348	80.44	79.31	-1.13	-1%
San Diego	2,293	117.75	115.73	-2.01	-2%
Ventura	1,966	92.58	92.89	0.31	0%

					%
>20 CCF	Bills	Baseline	New	Difference	Difference
LA-Baldwin Hills	1,162	175.00	159.11	-15.89	-9%
LA-Duarte	2,997	151.12	145.84	-5.28	-3%
LA-San Marino	3,746	164.98	161.24	-3.74	-2%
San Diego	1,235	223.88	216.80	-7.09	-3%
Ventura	2,457	184.59	182.29	-2.30	-1%

Central Division Technical Memorandum #1

Date: April 15, 2022

To: Jeffrey Linam

Fr: David Mitchell

Re: Revised: Central Division Fixed Cost Recovery Bill Impact Analysis

1 Introduction

This memorandum summarizes our analysis of the impacts to Central Division customer bills of increasing the recovery of fixed costs by meter charges. We completed this analysis using a bill impact model we developed for the Central Division. The bill impact model is based on bill tabulations for 2021 and is calibrated to replicate the Central Division's current rate designs and revenue requirement recovery. The remainder of this memorandum is organized as follows. In the next section, we describe the data, assumptions, and structure of the bill impact model. Following this, we describe the fixed cost recovery scenarios that we analyzed. We then summarize the estimated impacts to customer water use and bills under these scenarios.

2 Bill Impact Model

The bill impact model calculates customer bills under the current and an alternative rate design. The model solves for the standard meter charges and residential, multi-family, and non-residential commodity rates for the alternative rate design that satisfy the following four constraints:

- Central Division sales revenue = Central Division revenue requirement + customer surcharges
- Meter charge revenue recovers portion of Central Division fixed costs specified by the user. The current rate design recovers 32% of fixed costs from service charges.
- Residential revenue shares remain unchanged at 66% for Monterey Main.
- Central Satellite and Chualar rates and charges remain unchanged.

The revenue requirement is the sum of Central Division fixed costs and variable purchased water, power, and chemical costs, and Monterey Main customer surcharges. Variable costs are assumed to be proportional to total Central Division water sales. Unit costs for Central Division purchased water, power, and chemicals, and Monterey Main customer surcharges were provided by Cal Am.

Water sales are assumed to be a function of the variable cost of water paid by customers. The model is calibrated to 2021 actual water sales. The model calculates the change in customer water sales under the alternative rate design based on the percentage changes in the customer volume charges. These adjustments are governed by the demand elasticities shown in Table 1, which were estimated with econometric models of customer water use developed for the 2022 General Rate Case sales forecast.²

² M.Cubed. April 2022. California American Sales Forecast: 2022 General Rate Case. Report prepared by M.Cubed for California American Water Company, Tables 15 and 16.

Table 1. Demand Elasticities used in Bill Impact Model

District	Residential Elasticity	Multi Family Elasticity	Non-Residential Elasticity
Monterey	-0.315	-0.041	-0.092
Central Satellite	-0.315		-0.092
Chualar	-0.315		-0.092

The model is calibrated to replicate the underlying assumptions of the current Central Division rate designs. These assumptions are as follows:

- Meter charges recover 30% of the Central Division revenue requirement.
- The meter charge ratios, tier widths, relative rate differentials, CAP discount, CAP surcharge, and charges for private fire service are the same as the current rate design.

The calibrated standard meter charges and commodity rates differ slightly from the current rates posted on Cal Am's website because the revenue requirement, meter count, and sales level and distribution based on actual 2021 sales differ somewhat from the assumptions Cal Am used to calculate its posted rates. Differences in total sales, revenue requirement, and variable costs are shown in Table 2. The posted and model calibrated rates are provided in Table 3.

Table 2. Difference in Water Sales and Revenue Requirement

Model Variable	Used by Cal Am to Calculate Current Rates and Charges	Based on 2021 Billing Data
Water Sales (CCF)	3,939,554	3,945,296
Revenue Requirement*	75,744,269	75,540,024
Fixed Costs	71,796,038	71,796,038
Variable Costs	3,948,231	3,953,986
*Excluding customer surcharges		

Table 3. Comparison of Posted and Model Calibrated Rates

Calibrated					Posted on Cal Am Website			
Non-Residential Rates (\$/CCF)					Div. 1	Div. 2	Div. 3	Div. 4
Monterey	14.43	16.23	18.04	36.08	14.19	15.96	17.74	35.47
Cen. Satellite	9.83				9.66			
Chualar	0.81				0.80			

Residential Rates (\$/CCF)					Tier 1	Tier 2	Tier 3	Tier 4
Main Residential	7.9689	11.9537	31.8764	47.8142	7.8353	11.7533	31.3419	47.0125
Main Multi Fam.	6.1317	9.1968	24.5252	36.7886	6.0289	9.0426	24.1140	36.1718
Cen. Satellite	5.7696	9.6152	11.5384	16.8271	5.6728	9.4540	11.3449	16.5450
Chualar	0.8087				0.7951			

Standard Meter Charges (\$/bill)		
	Calibrated	Posted
Main Residential	29.17	28.68
Main Non-Res.	32.16	31.62
Cen. Satellite	15.44	15.18
Chualar	28.22	27.75

3 Model Overidentification

The model is overidentified in terms of the parameters that can be adjusted to satisfy the revenue requirement, fixed cost recovery, and residential revenue share constraints. Additional restrictions on Monterey Main rates and charges are therefore needed to generate the set of rates and charges that uniquely satisfy the three constraints. For this analysis, we adopted the following additional restrictions on the Monterey Main rate design:

- The non-standard meter ratios used to calculate the residential and multi-family meter charges are maintained.
- The relative differential between the residential and non-residential standard meter charge is maintained.
- The relative differentials between the non-residential divisional rates are maintained.
- The relative differentials between the residential and multi-family rates are maintained.
- The relative differentials in rates across the tiers are maintained.

These restrictions produce a set of rates and charges that uniquely satisfy the model's revenue requirement, fixed cost recovery, and residential revenue share constraints. Other restrictions could be substituted for these ones. However, these restrictions provide an informative starting point for understanding the impacts on customer bills of increasing the recovery of fixed costs from meter charges for the Central Division.

4 Water Use Adjustment

As noted above, water use under the new rates and charges is adjusted in proportion to the change in each bill's variable water charge using the demand elasticities in Table 1. These adjustments are capped in absolute value to no more than 15% to reflect the likely range of adjustment in the short-run. In the longer-run, the adjustments could be greater as households and businesses adjust their stock of water using capital in response to the change in the variable cost of water.

5 Fixed Cost Recovery Scenarios

Under the current rate design, the Central Division recovers 32% of its fixed cost from meter charges. We calculate the rates and charges that recover the following percentages of fixed cost from meter charges:

- Scenario 1: 40%
- Scenario 2: 45%
- Scenario 3: 50%
- Scenario 4: 55%
- Scenario 5: 60%

6 Model Results: Standard Meter Charges and Rates

Tables 4 through 7 show Monterey Main's standard meter charges and commodity charges under each scenario. Rates and charges for Central Satellite and Chualar are kept constant in these model runs.

Table 4. Monterey Main Standard Meter Charges by Fixed Cost Recovery Scenario

Scenario	Fixed Cost Recovered	Residential & Multi Family	Non-Residential
Current	32%	29.17	32.16
Scenario 1	40%	37.22	41.03
Scenario 2	45%	42.05	46.36
Scenario 3	50%	46.89	51.69
Scenario 4	55%	51.72	57.02
Scenario 5	60%	56.55	62.35

Table 5. Non-Residential Divisional Rates (\$/CCF)

Scenario	Fixed Cost Recovered	Division 1	Division 2	Division 3	Division 4
Current	32%	14.43	16.23	18.04	36.08
Scenario 1	40%	13.57	15.27	16.96	33.92
Scenario 2	45%	13.06	14.69	16.32	32.64
Scenario 3	50%	12.54	14.11	15.68	31.36
Scenario 4	55%	12.03	13.53	15.03	30.07
Scenario 5	60%	11.51	12.95	14.39	28.77

Table 6. Residential Tier Rates (\$/CCF)

Scenario	Fixed Cost Recovered	Tier 1	Tier 2	Tier 3	Tier 4
Current	32%	7.97	11.95	31.88	47.81
Scenario 1	40%	6.26	9.39	25.03	37.54
Scenario 2	45%	5.33	7.99	21.30	31.95
Scenario 3	50%	4.48	6.72	17.91	26.87
Scenario 4	55%	3.79	5.69	15.17	22.75
Scenario 5	60%	3.17	4.75	12.66	18.99

Table 7. Multi Family Tier Rates (\$/CCF)

Scenario	Fixed Cost Recovered	Tier 1	Tier 2	Tier 3	Tier 4
Current	32%	6.13	9.20	24.53	36.79
Scenario 1	40%	4.81	7.22	19.26	28.88
Scenario 2	45%	4.10	6.15	16.39	24.58
Scenario 3	50%	3.45	5.17	13.78	20.67
Scenario 4	55%	2.92	4.38	11.67	17.50
Scenario 5	60%	2.44	3.65	9.74	14.61

7 Model Results: Water Sales

Table 8 shows the estimated change in Central Division water sales by scenario. Recall that adjusted sales are capped in absolute value to no more than 15% to reflect the likely range of adjustment in the

short-run. In the longer-run, the adjustments could be greater as households and businesses adjust their stock of water using capital in response to the change in the variable cost of water.

The sales increases reported in Table 8 are predicated on net revenue neutrality and thus are measuring only the impact of the rate design on water use. Increases in the net revenue requirement due to rising operating costs will work in the opposite direction. The bill impact model indicates that Central Division water use would decrease slightly (~1%) under Cal Am's proposed rates. In other words, the increase in water use due to the change in the rate design would be fully offset by the decrease in sales due to the higher revenue requirement.

Table 8. Change in Central Division Water Sales by Scenario

Scenario	Fixed Cost Recovered	Monterey Main	Central Satellite	Chualar	Total
Scenario 1	40%	3%	0%	0%	3%
Scenario 2	45%	5%	0%	0%	5%
Scenario 3	50%	7%	0%	0%	6%
Scenario 4	55%	8%	0%	0%	8%
Scenario 5	60%	9%	0%	0%	8%

8 Model Results: Revenue Requirement

Table 9 shows the change in Central Division revenue requirement by scenario. Revenue requirement barely changes across the scenarios because most Central Division costs are fixed.

Table 9. Change in Central Division Revenue Requirement by Scenario

Scenario	Fixed Cost Recovered	Revenue Requirement*
Current	32%	104,857,926
Scenario 1	40%	105,605,614
Scenario 2	45%	106,087,730
Scenario 3	50%	106,571,060
Scenario 4	55%	106,880,714
Scenario 5	60%	107,063,181
* Including customer surcharges		

9 Model Results: Bill Impacts

Bill impacts associated with each scenario are shown in the following tables. Impacts are shown for:

- The average residential bill
- The average non-CAP and CAP residential bills overall and by usage level
- The average non-residential bill

Monterey Main bills are inclusive of surcharges.

These rate designs shift cost recovery from high to low volume customers. The degree of the shift increases with each scenario as more fixed cost is recovered from meter charges. Changes in the tier widths and rate differentials would be needed to counteract these effects.

Central Div. Scenario 1

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	147.03	2.60	2%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	151.94	2.69	2%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	97.63	1.64	2%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	419.37	-17.26	-4%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	792.27	1.68	0%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 1

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	86.03	7.19	9%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	172.44	2.59	2%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	348.38	-11.16	-3%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	598.71	-26.10	-4%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,410.54	-136.40	-9%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 1**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	88.29	7.49	9%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	177.13	2.88	2%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	356.93	-11.14	-3%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	605.35	-26.45	-4%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,419.94	-137.04	-9%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 1

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	63.26	4.20	7%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.76	0.00	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	253.93	-11.37	-4%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	469.28	-19.17	-4%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	1,076.69	-113.56	-10%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 2

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	148.55	4.12	3%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	153.52	4.27	3%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	98.60	2.61	3%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	411.20	-25.43	-6%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	793.34	2.75	0%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 2**Average Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	90.44	11.60	15%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	%
Monterey	95,179	169.85	173.74	3.90	2%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	%
Monterey	21,212	359.54	341.41	-18.13	-5%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	%
Monterey	6,010	624.81	580.95	-43.86	-7%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	%
Monterey	5,589	1,546.94	1,329.51	-217.43	-14%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 2

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	92.87	12.07	15%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	178.59	4.34	2%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	349.96	-18.11	-5%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	587.42	-44.38	-7%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,338.57	-218.41	-14%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 2

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	65.86	6.79	11%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.63	-0.13	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	246.88	-18.41	-7%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	454.66	-33.80	-7%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	1,007.65	-182.59	-15%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 3

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	149.97	5.53	4%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	154.98	5.72	4%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	99.62	3.63	4%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	405.00	-31.63	-7%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	794.42	3.83	0%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 3

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	94.94	16.10	20%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	175.00	5.16	3%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	334.91	-24.63	-7%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	561.57	-63.24	-10%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
					%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,236.89	-310.05	-20%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 3**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	97.56	16.76	21%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	180.00	5.75	3%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	343.43	-24.63	-7%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	567.89	-63.91	-10%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,245.49	-311.49	-20%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 3

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	68.54	9.47	16%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.51	-0.24	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	240.69	-24.61	-9%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	438.27	-50.18	-10%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	931.29	-258.95	-22%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 4 Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	150.77	6.33	4%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP	Bills	Baseline	New	Difference	%
Monterey	361,946	149.25	155.74	6.49	4%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP	Bills	Baseline	New	Difference	%
Monterey	35,968	95.99	100.67	4.68	5%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family	Bills	Baseline	New	Difference	%
Monterey	20,960	436.63	402.76	-33.87	-8%
Central Satellite					
Chualar					
Non-Residential	Bills	Baseline	New	Difference	%
Monterey	45,440	790.59	795.32	4.73	1%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 4

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	99.74	20.90	27%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	176.52	6.67	4%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	322.12	-37.42	-10%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	523.92	-100.89	-16%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,125.01	-421.93	-27%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 4**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	102.54	21.74	27%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	181.64	7.39	4%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	330.12	-37.94	-10%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	529.89	-101.91	-16%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,133.27	-423.71	-27%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 4

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	71.45	12.38	21%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Monterey	9,423	129.76	129.92	0.16	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Monterey	1,760	265.30	233.63	-31.67	-12%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Monterey	293	488.45	407.44	-81.01	-17%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Monterey	153	1,190.24	831.54	-358.70	-30%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 5 Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	151.18	6.74	5%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP	Bills	Baseline	New	Difference	%
Monterey	361,946	149.25	156.13	6.88	5%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP	Bills	Baseline	New	Difference	%
Monterey	35,968	95.99	101.38	5.39	6%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family	Bills	Baseline	New	Difference	%
Monterey	20,960	436.63	401.94	-34.69	-8%
Central Satellite					
Chualar					
Non-Residential	Bills	Baseline	New	Difference	%
Monterey	45,440	790.59	796.09	5.50	1%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 5

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	104.51	25.67	33%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	176.09	6.25	4%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	307.32	-52.22	-15%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	489.62	-135.19	-22%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,024.41	-522.53	-34%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 5**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	107.49	26.69	33%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	181.17	6.92	4%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	315.14	-52.92	-14%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	495.52	-136.27	-22%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,032.38	-524.59	-34%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 5

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	74.42	15.36	26%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.84	0.08	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	220.80	-44.50	-17%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	374.39	-114.07	-23%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	740.91	-449.34	-38%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Division Technical Memorandum #2

Date: April 18, 2022

To: Jeffrey Linam

Fr: David Mitchell

Re: Central Division Fixed Cost Recovery Bill Impact Follow-On Scenarios

1 Introduction

This memorandum presents results for four follow-on scenarios to our revised April 15 analysis of five fixed cost recovery scenarios. The original and follow-on scenarios are summarized in Table 1.

Table 1. Central Division Bill Impact Scenarios

Scenario	Scenario Category	Fixed cost from meter charge	Ratio of non-residential to residential standard meter charge	Increase in Central Division Revenue Requirement
Current Rate Design		32%	1.1	0%
Scenario 1	Original	40%	1.1	0%
Scenario 2	Original	45%	1.1	0%
Scenario 3	Original	50%	1.1	0%
Scenario 4	Original	55%	1.1	0%
Scenario 5	Original	60%	1.1	0%
Scenario 6	Follow-On	50%	1.2	0%
Scenario 7	Follow-On	50%	1.5	0%
Scenario 8	Follow-On	50%	1.2	15%
Scenario 9	Follow-On	50%	1.5	15%

The following is noted regarding the follow-on scenarios and presentation of results:

- All four follow-on scenarios recover 50% of Central Division fixed costs from meter charges, the same as the original Scenario 3. In the remaining tables, the follow-on scenarios are compared to the current rate design and Scenario 3. The results for the other scenarios are not reproduced in this memorandum.
- Follow-on Scenarios 6 and 8 increase the ratio of the non-residential to the residential standard meter charge from 1.1 to 1.2.
- Follow-on Scenarios 7 and 9 increase the ratio of the non-residential to the residential standard meter charge from 1.1 to 1.5.
- Follow-on Scenarios 6 and 7 keep the baseline revenue requirement unchanged.
- Follow-on Scenarios 8 and 9 increase the baseline revenue requirement 15%.

As with the original scenarios, the following restrictions are imposed:

- Sales revenue must equal revenue requirement. Revenue requirement is equal to the sum of fixed and variable water service costs plus customer surcharges.
- Monterey Main residential revenue share is kept at its current level (66%).
- Central Satellite and Chualar rates and charges are kept at their current levels.
- The non-standard meter ratios used to calculate the residential and multi-family meter charges are maintained.
- The relative differentials between the non-residential divisional rates are maintained.
- The relative differentials between the residential and multi-family rates are maintained.
- The relative differentials in rates across the tiers are maintained.
- Customer water use can adjust no more than 15% in absolute value.

2 Model Results: Standard Meter Charges and Rates

Tables 2 through 5 show the rates and charges under each scenario.

Table 2. Monterey Main Standard Meter Charges by Fixed Cost Recovery Scenario

Scenario	Scenario Category	Fixed Cost from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Residential & Multi Family	Non-Residential
Current		32%	1.1	0%	29.17	32.16
Scenario 3	Original	50%	1.1	0%	46.89	51.69
Scenario 6	Follow-On	50%	1.2	0%	46.08	55.30
Scenario 7	Follow-On	50%	1.5	0%	43.76	65.64
Scenario 8	Follow-On	50%	1.2	15%	53.21	63.85
Scenario 9	Follow-On	50%	1.5	15%	50.53	75.79

Table 3. Non-Residential Divisional Rates (\$/CCF)

Scenario	Scenario Category	Fixed Cost from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Div 1	Div 2	Div 3	Div 4
Current		32%	1.1	0%	14.43	16.23	18.04	36.08
Scenario 3	Original	50%	1.1	0%	12.54	14.11	15.68	31.36
Scenario 6	Follow-On	50%	1.2	0%	12.18	13.71	15.23	30.46
Scenario 7	Follow-On	50%	1.5	0%	11.16	12.55	13.95	27.89
Scenario 8	Follow-On	50%	1.2	15%	14.21	15.99	17.76	35.53
Scenario 9	Follow-On	50%	1.5	15%	13.01	14.63	16.26	32.52

Table 4. Residential Rates (\$/CCF)

Scenario	Scenario Category	Fixed Cost Recovered from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Tier 1	Tier 2	Tier 3	Tier 4
Current		32%	1.1	0%	7.97	11.95	31.88	47.81
Scenario 3	Original	50%	1.1	0%	4.48	6.72	17.91	26.87
Scenario 6	Follow-On	50%	1.2	0%	4.61	6.91	18.43	27.64
Scenario 7	Follow-On	50%	1.5	0%	5.01	7.52	20.06	30.08
Scenario 8	Follow-On	50%	1.2	15%	5.59	8.39	22.38	33.57
Scenario 9	Follow-On	50%	1.5	15%	6.11	9.17	24.46	36.69

Table 5. Multi Family Rates (\$/CCF)

Scenario	Scenario Category	Fixed Cost Recovered from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Tier 1	Tier 2	Tier 3	Tier 4
Current		32%	1.1	0%	6.13	9.20	24.53	36.79
Scenario 3	Original	50%	1.1	0%	3.45	5.17	13.78	20.67
Scenario 6	Follow-On	50%	1.2	0%	3.54	5.32	14.18	21.27
Scenario 7	Follow-On	50%	1.5	0%	3.86	5.79	15.43	23.15
Scenario 8	Follow-On	50%	1.2	15%	4.31	6.46	17.22	25.83
Scenario 9	Follow-On	50%	1.5	15%	4.70	7.06	18.82	28.23

3 Model Results: Water Sales

Increasing the ratio of the non-residential to the residential standard meter charge results in proportionately larger decreases in the non-residential commodity rates compared to the residential and multi-family rates. Because non-residential water demand is less elastic than residential, this has the effect of mitigating some of the increase in water use that would otherwise occur in response to the shift in fixed cost recovery from the commodity to the meter charge. This is essentially a Ramsey-like pricing strategy where relative differences in the price elasticity of demand are being used to limit the change in water sales relative to the status quo.³ The change in water sales under each scenario is shown in Table 6.

The sales increases reported in Table 6 are predicated on net revenue neutrality and thus are measuring only the impact of the rate design on water use. Increases in the net revenue requirement due to rising

³ https://en.wikipedia.org/wiki/Ramsey_problem

operating costs will work in the opposite direction. The bill impact model indicates that Central Division water use would decrease slightly (~1%) under Cal Am's proposed rates. In other words, the increase in water use due to the change in the rate design would be fully offset by the decrease in sales due to the higher revenue requirement.

Table 6. Change in Monterey Main Water Sales by Scenario

Scenario	Scenario Category	Fixed Cost Recovered from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Increase in Monterey Main Water Sales
Scenario 3	Original	50%	1.1	0%	7%
Scenario 6	Follow-On	50%	1.1	0%	6%
Scenario 7	Follow-On	50%	1.2	0%	6%
Scenario 8	Follow-On	50%	1.5	0%	4%
Scenario 9	Follow-On	50%	1.2	15%	3%

4 Model Results: Revenue Requirement

Table 7 shows the change in Central Division revenue requirement, including surcharges, by scenario. Scenarios 8 and 9 reflect the assumed 15% increase in Central Division fixed costs and unit costs for purchased water, electricity, and chemicals.

Table 7. Change in Central Division Revenue Requirement by Scenario

Scenario	Scenario Category	Fixed Cost Recovered from Meter Charge	Non-Res to Res Meter Ratio	Increase in Rev Req'm't	Revenue Requirement
Current		32%	1.1	0%	104,857,926
Scenario 3	Original	50%	1.1	0%	106,571,060
Scenario 6	Follow-On	50%	1.2	0%	106,525,364
Scenario 7	Follow-On	50%	1.5	0%	106,356,826
Scenario 8	Follow-On	50%	1.2	15%	118,076,849
Scenario 9	Follow-On	50%	1.5	15%	117,879,243

5 Model Results: Bill Impacts

Bill impacts associated with each scenario are shown in the following tables. Impacts are shown for:

- The average residential bill
- The average non-CAP and CAP residential bills overall and by usage level
- The average non-residential bill

These rate designs shift cost recovery from high to low volume customers. Changes in the tier widths and rate differentials would be needed to counteract these effects.

Central Div. Scenario 3

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	149.97	5.53	4%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	154.98	5.72	4%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	99.62	3.63	4%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	405.00	-31.63	-7%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	794.42	3.83	0%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 3

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	94.94	16.10	20%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	175.00	5.16	3%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	334.91	-24.63	-7%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	561.57	-63.24	-10%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,236.89	-310.05	-20%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 3**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	97.56	16.76	21%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	180.00	5.75	3%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	343.43	-24.63	-7%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	567.89	-63.91	-10%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,245.49	-311.49	-20%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 3

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	68.54	9.47	16%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.51	-0.24	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	240.69	-24.61	-9%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	438.27	-50.18	-10%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	931.29	-258.95	-22%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 6 Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	149.78	5.35	4%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	154.79	5.54	4%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	99.44	3.45	4%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	405.72	-30.91	-7%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	794.72	4.13	1%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 6

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	94.17	15.33	19%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	174.74	4.90	3%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	335.88	-23.66	-7%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	565.19	-59.62	-10%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,257.87	-289.07	-19%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 6**Average Non-CAP Residential Bill by Usage Range**

						%
0-5 CCF	Bills	Baseline	New	Difference	Difference	
Monterey	245,585	80.80	96.75	15.95	20%	
Central Satellite	4,268	55.17	55.17	0.00	0%	
Chualar	366	72.60	72.60	0.00	0%	
						%
6-10 CCF	Bills	Baseline	New	Difference	Difference	
Monterey	85,756	174.25	179.71	5.46	3%	
Central Satellite	2,914	83.36	83.36	0.00	0%	
Chualar	456	82.79	82.79	0.00	0%	
						%
11-15 CCF	Bills	Baseline	New	Difference	Difference	
Monterey	19,452	368.07	344.41	-23.66	-6%	
Central Satellite	1,277	134.56	134.56	0.00	0%	
Chualar	336	91.44	91.44	0.00	0%	
						%
16-20 CCF	Bills	Baseline	New	Difference	Difference	
Monterey	5,717	631.80	571.56	-60.24	-10%	
Central Satellite	693	187.81	187.81	0.00	0%	
Chualar	188	94.31	94.31	0.00	0%	
						%
>20 CCF	Bills	Baseline	New	Difference	Difference	
Monterey	5,436	1,556.98	1,266.60	-290.38	-19%	
Central Satellite	1,376	423.15	423.15	0.00	0%	
Chualar	291	156.11	156.11	0.00	0%	

Central Div. Scenario 6

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	68.07	9.00	15%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.49	-0.27	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	241.65	-23.65	-9%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	440.92	-47.53	-10%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	947.67	-242.57	-20%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 7

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	149.10	4.67	3%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	361,946	149.25	154.09	4.84	3%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP					%
	Bills	Baseline	New	Difference	Difference
Monterey	35,968	95.99	98.95	2.97	3%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family					%
	Bills	Baseline	New	Difference	Difference
Monterey	20,960	436.63	408.72	-27.91	-6%
Central Satellite					
Chualar					
Non-Residential					%
	Bills	Baseline	New	Difference	Difference
Monterey	45,440	790.59	795.59	5.00	1%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 7**Average Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	92.01	13.17	17%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	174.17	4.33	3%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	339.11	-20.43	-6%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	574.35	-50.46	-8%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,301.16	-245.77	-16%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 7**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	94.51	13.71	17%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	179.07	4.82	3%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	347.65	-20.42	-6%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	580.78	-51.02	-8%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,310.11	-246.87	-16%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 7**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	66.79	7.72	13%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	129.57	-0.19	0%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	244.69	-20.61	-8%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	448.99	-39.47	-8%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	983.22	-207.03	-17%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 8

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	166.04	21.60	15%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP	Bills	Baseline	New	Difference	%
Monterey	361,946	149.25	171.69	22.44	15%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP	Bills	Baseline	New	Difference	%
Monterey	35,968	95.99	109.12	13.13	14%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family	Bills	Baseline	New	Difference	%
Monterey	20,960	436.63	453.30	16.67	4%
Central Satellite					
Chualar					
Non-Residential	Bills	Baseline	New	Difference	%
Monterey	45,440	790.59	884.67	94.08	12%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 8

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	105.61	26.77	34%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	191.77	21.92	13%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	366.60	7.06	2%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	617.31	-7.50	-1%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
					%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,399.70	-147.24	-10%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 8**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	108.57	27.78	34%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	197.38	23.13	13%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	376.19	8.12	2%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	624.68	-7.12	-1%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,409.77	-147.21	-9%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 8

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	75.69	16.62	28%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	140.68	10.92	8%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	260.68	-4.61	-2%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	473.55	-14.90	-3%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	1,041.72	-148.52	-12%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Central Div. Scenario 9

Average Bill

					%
Residential - All	Bills	Baseline	New	Difference	Difference
Monterey	397,914	144.44	165.20	20.76	14%
Central Satellite	10,833	128.24	128.24	0.00	0%
Chualar	2,201	89.07	89.07	0.00	0%
Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Monterey	361,946	149.25	170.83	21.57	14%
Central Satellite	10,528	129.43	129.43	0.00	0%
Chualar	1,637	96.64	96.64	0.00	0%
Residential - CAP	Bills	Baseline	New	Difference	% Difference
Monterey	35,968	95.99	108.58	12.60	13%
Central Satellite	305	87.02	87.02	0.00	0%
Chualar	564	67.09	67.09	0.00	0%
Multi Family	Bills	Baseline	New	Difference	% Difference
Monterey	20,960	436.63	457.90	21.27	5%
Central Satellite					
Chualar					
Non-Residential	Bills	Baseline	New	Difference	% Difference
Monterey	45,440	790.59	885.52	94.93	12%
Central Satellite	355	679.57	679.57	0.00	0%
Chualar	96	173.71	173.71	0.00	0%

Central Div. Scenario 9

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	269,924	78.84	103.17	24.34	31%
Central Satellite	4,372	54.76	54.76	0.00	0%
Chualar	393	71.63	71.63	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	95,179	169.85	191.04	21.20	12%
Central Satellite	3,009	82.37	82.37	0.00	0%
Chualar	616	77.86	77.86	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	21,212	359.54	370.55	11.01	3%
Central Satellite	1,323	133.21	133.21	0.00	0%
Chualar	501	82.60	82.60	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	6,010	624.81	627.10	2.29	0%
Central Satellite	724	185.76	185.76	0.00	0%
Chualar	287	85.10	85.10	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,589	1,546.94	1,444.65	-102.29	-7%
Central Satellite	1,405	420.79	420.79	0.00	0%
Chualar	404	133.97	133.97	0.00	0%

Central Div. Scenario 9**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	245,585	80.80	106.04	25.24	31%
Central Satellite	4,268	55.17	55.17	0.00	0%
Chualar	366	72.60	72.60	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	85,756	174.25	196.57	22.32	13%
Central Satellite	2,914	83.36	83.36	0.00	0%
Chualar	456	82.79	82.79	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	19,452	368.07	380.14	12.08	3%
Central Satellite	1,277	134.56	134.56	0.00	0%
Chualar	336	91.44	91.44	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,717	631.80	634.56	2.76	0%
Central Satellite	693	187.81	187.81	0.00	0%
Chualar	188	94.31	94.31	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	5,436	1,556.98	1,454.92	-102.06	-7%
Central Satellite	1,376	423.15	423.15	0.00	0%
Chualar	291	156.11	156.11	0.00	0%

Central Div. Scenario 9

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Monterey	24,339	59.07	74.25	15.19	26%
Central Satellite	104	37.63	37.63	0.00	0%
Chualar	27	58.45	58.45	0.00	0%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Monterey	9,423	129.76	140.75	10.99	8%
Central Satellite	95	51.82	51.82	0.00	0%
Chualar	160	63.81	63.81	0.00	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Monterey	1,760	265.30	264.58	-0.72	0%
Central Satellite	46	95.74	95.74	0.00	0%
Chualar	165	64.59	64.59	0.00	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	293	488.45	481.57	-6.88	-1%
Central Satellite	31	139.81	139.81	0.00	0%
Chualar	99	67.62	67.62	0.00	0%
>20 CCF	Bills	Baseline	New	Difference	Difference
Monterey	153	1,190.24	1,079.97	-110.27	-9%
Central Satellite	29	309.16	309.16	0.00	0%
Chualar	113	76.97	76.97	0.00	0%

Northern Division Technical Memorandum #1

Date: April 13, 2022

To: Jeffrey Linam

Fr: David Mitchell

Re: Northern Division Partial Rate Consolidation and Fixed Cost Recovery Analysis

1 Introduction

This memorandum summarizes our analysis of the impacts to customer bills of partial consolidation of Northern Division rates and increasing the recovery of fixed costs by meter charges. We completed this analysis using a bill impact model we developed for the Northern Division. The bill impact model is based on bill tabulations for 2021 and is calibrated to replicate the Northern Division's current rate designs and revenue requirement recovery. The remainder of this memorandum is organized as follows. In the next section, we describe the data, assumptions, and structure of the bill impact model. Following this, we describe the partial rate consolidation and fixed cost recovery scenarios that we analyzed. We then summarize the estimated impacts to customer water use and bills.

2 Bill Impact Model

The bill impact model calculates customer bills under the current and an alternative rate design. The model solves for the standard meter charges and single-quantity rates (SQR) for the alternative rate design that satisfy the following three constraints:

- Northern Division sales revenue = Northern Division revenue requirement
- Meter charge revenue recovers portion of Northern Division fixed costs specified by the user. The current rate design recovers 36% of fixed costs from service charges.
- Larkfield's sales revenue is kept constant at its current level.

The revenue requirement is the sum of Northern Division fixed costs and variable purchased water, power, and chemical costs. Variable costs are assumed to be proportional to total Northern Division water sales. Unit costs for Northern Division purchased water, power, and chemicals were provided by Cal Am.

Water sales are assumed to be a function of the variable cost of water paid by customers. The model is calibrated to 2021 actual water sales. The model calculates the change in customer water sales under the alternative rate design based on the percentage changes in the customer volume charges. These adjustments are governed by the demand elasticities shown in Table 1, which were estimated with econometric models of customer water use developed for the 2022 General Rate Case sales forecast.⁴

⁴ M.Cubed. April 2022. California American Sales Forecast: 2022 General Rate Case. Report prepared by M.Cubed for California American Water Company, Tables 15 and 16.

Table 1. Demand Elasticities used in Bill Impact Model

District	Residential Elasticity	Non-Residential Elasticity
Fruitridge	-0.093	-0.147
Larkfield	-0.343	-0.36
Meadowbrook	-0.093	-0.147
Sacramento	-0.093	-0.147

The model is calibrated to replicate the underlying assumptions of the current Northern Division rate designs. These assumptions are as follows:

- Meter charges recover 30% of the combined revenue requirement for Larkfield, Meadowbrook, and Sacramento, and 33% of the total Northern Division revenue requirement inclusive of the Fruitridge district.
- The non-residential rate in each district is set to the district's SQR.
- Each district's SQR is scaled by the percentages in Table 2 to establish the residential rate in each tier. Fruitridge currently operates under a uniform residential rate. Meadowbrook and Sacramento have three-tier rates, and Larkfield has a four-tier rate.

Table 2. Northern Division SQR Ratios

District	Tier 1	Tier 2	Tier 3	Tier 4
Fruitridge	100.0%			
Larkfield	96.0%	100.0%	115.0%	130.5%
Meadowbrook	95.0%	100.0%	111.4%	
Sacramento	85.8%	115.0%	145.7%	

- The tier widths, CAP discount, CAP surcharge, and charges for private fire service are the same as the current rate design.

The calibrated standard meter charges and SQRs differ slightly from the current rates posted on Cal Am's website because the revenue requirement and sales volumes based on actual 2021 sales differ somewhat from the assumptions Cal Am used to calculate its posted rates. These differences are shown in Table 3. The posted and model calibrated rates are provided in Table 4.

Table 3. Difference in Water Sales and Revenue Requirement

Model Variable	Used by Cal Am to Calculate Current Rates and Charges	Based on 2021 Billing Data
Water Sales (CCF)	14,274,894	13,852,432
Revenue Requirement	76,918,395	76,711,663
Fixed Costs	69,932,979	69,932,979
Variable Costs	6,985,416	6,778,684

Table 4. Comparison of Posted and Model Calibrated Rates

Rate	Based on Sales Assumptions Used by Cal Am to Calculate Rates and Charges	Calibrated to 2021 Billing Data
Standard Meter Charge		
Fruitridge	15.58	15.58
Larkfield	17.99	17.30
Meadowbrook	19.77	19.02
Sacramento	19.16	18.43
SQR (\$/CCF)		
Fruitridge	1.7994	1.7994
Larkfield	6.6684	6.7359
Meadowbrook	1.8199	1.8383
Sacramento	3.9637	4.0038

3 Model Overidentification

The model is overidentified in terms of the parameters that can be adjusted to satisfy the revenue requirement, fixed cost recovery, and Larkfield revenue constraints. Additional restrictions on rates and charges are therefore needed to generate the set of rates and charges that uniquely satisfy the three constraints. For this analysis, we adopted the following additional restrictions:

- The meter charge is standardized across the four districts
- The SQRs for Fruitridge and Meadowbrook are standardized and made proportional to Sacramento's SQR.
- The standardized SQR for Fruitridge and Meadowbrook is scaled to equal 70% of Sacramento's SQR (currently, the SQRs for these two districts equal about 45% of Sacramento's SQR).
- The SQR step-ups and tiers for Fruitridge and Meadowbrook are standardized to Sacramento's.
- The flat rate for unmetered Fruitridge customers is increased by the same percentage amount as the average bill increase for Fruitridge metered residential customers.

These restrictions produce a set of rates and charges that uniquely satisfy the model's revenue requirement, fixed cost recovery, and Larkfield revenue constraints. Other restrictions could be substituted for these ones. However, these restrictions provide an informative starting point for understanding the impacts on customer bills of moving towards a consolidated rate design for the Northern Division.

4 Fixed Cost Recovery Scenarios

Under the current rate design, the Northern Division recovers 36% of its fixed cost from meter charges. Under the partially consolidated rate design, we calculate the rates and charges that recover the following percentages of fixed cost from meter charges:

- Scenario 1: 36% (same as the current rate design)

- Scenario 2: 40%
- Scenario 3: 45%
- Scenario 4: 50%
- Scenario 5: 55%
- Scenario 6: 60%

5 Model Results: Standard Meter Charge and SQRs

Tables 6 and 7 show the standard meter charge and the SQRs by scenario, respectively.

Table 5. Standard Meter Charge by Fixed Cost Recovery Scenario

Scenario	Fixed Cost Recovered	Fruitridge	Larkfield	Meadowbrook	Sacramento
Current	36%	15.58	17.30	19.02	18.43
Scenario 1	36%	17.87	17.87	17.87	17.87
Scenario 2	40%	20.23	20.23	20.23	20.23
Scenario 3	45%	22.97	22.97	22.97	22.97
Scenario 4	50%	25.71	25.71	25.71	25.71
Scenario 5	55%	28.44	28.44	28.44	28.44
Scenario 6	60%	31.18	31.18	31.18	31.18

Table 6. SQRs by Fixed Cost Recovery Scenario

Scenario	Fixed Cost Recovered	Fruitridge	Larkfield	Meadowbrook	Sacramento
Current	36%	1.7994	6.7359	1.8383	4.0038
Scenario 1	36%	2.7485	6.5760	2.7485	3.9265
Scenario 2	40%	2.5713	5.9194	2.5713	3.6733
Scenario 3	45%	2.3678	5.1891	2.3678	3.3825
Scenario 4	50%	2.1668	4.4938	2.1668	3.0954
Scenario 5	55%	1.9685	3.8352	1.9685	2.8121
Scenario 6	60%	1.7732	3.2145	1.7732	2.5331

6 Model Results: Water Sales

Table 8 shows the estimated change in Northern Division water sales by scenario. Impacts are especially large for Larkfield. This occurs because of the revenue constraint that holds Larkfield's revenue requirement constant across the scenarios. As the standardized meter charge increases, Larkfield's SQR must be adjusted down significantly to satisfy the constraint which in turn incentivizes greater water use.

The sales increases reported in Table 7 are predicated on net revenue neutrality and thus are measuring only the impact of the rate design on water use. Increases in the net revenue requirement due to rising operating costs will work in the opposite direction. The bill impact model indicates that Northern

Division water use would not change under Cal Am's proposed rates. In other words, the increase in water use due to the change in the rate design would be fully offset by the decrease in sales due to the higher revenue requirement.

Table 7. Change in Northern Division Water Sales by Scenario

Scenario	Fixed Cost Recovered	Fruitridge	Larkfield	Meadowbrook	Sacramento	Total
Scenario 1	36%	-3%	1%	-4%	0%	0%
Scenario 2	40%	-2%	5%	-3%	1%	1%
Scenario 3	45%	-2%	10%	-3%	2%	2%
Scenario 4	50%	-1%	15%	-2%	3%	3%
Scenario 5	55%	-1%	22%	-1%	4%	4%
Scenario 6	60%	0%	29%	0%	5%	5%

7 Model Results: Revenue Requirement

Table 9 shows the change in Northern Division revenue requirement by scenario. Revenue requirement barely changes across the scenarios because most Northern Division costs are fixed.

Table 8. Change in Northern Division Revenue Requirement by Scenario

Scenario	Fixed Cost Recovered	Revenue Requirement
Current	36%	76,711,663
Scenario 1	36%	76,702,152
Scenario 2	40%	76,756,838
Scenario 3	45%	76,825,405
Scenario 4	50%	76,900,383
Scenario 5	55%	76,982,984
Scenario 6	60%	77,074,801

8 Model Results: Bill Impacts

Bill impacts associated with each scenario are shown in the following tables. Impacts are shown for:

- The average residential bill
- The average non-CAP and CAP residential bills overall and by usage level
- The average non-residential bill

Water usage percentiles for each district are provided in Table 10 for reference. These may be useful in conjunction with the bill impacts by customer usage level.

Table 9. District Usage Percentiles in CCF

District	P01	P05	P10	P25	P50	P75	P90	P95	P99
Fruitridge	0	0	0	4	10	18	30	39	79
Larkfield	0	1	2	4	6	10	16	20	36
Meadowbrook	0	3	4	7	13	22	33	43	76
Sacramento	0	0	1	4	8	14	21	28	46
Total	0	0	1	4	8	14	22	28	47

Northern Div. Scenario 1**Average Bill**

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	77.07	13.16	21%
Larkfield	23,742	84.21	84.39	0.18	0%
Meadowbrook	19,864	53.79	67.19	13.40	25%
Sacramento	688,499	59.84	58.58	-1.26	-2%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	79.78	13.61	21%
Larkfield	21,860	86.49	86.68	0.19	0%
Meadowbrook	18,905	53.92	67.38	13.46	25%
Sacramento	597,318	61.29	60.00	-1.29	-2%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	51.23	8.86	21%
Larkfield	1,882	57.80	57.82	0.03	0%
Meadowbrook	959	51.16	63.42	12.26	24%
Sacramento	91,181	50.40	49.33	-1.06	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	408.07	110.99	37%
Larkfield	3,900	259.07	258.01	-1.07	0%
Meadowbrook	724	331.78	405.26	73.48	22%
Sacramento	68,726	382.12	374.52	-7.60	-2%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	66.17	11.10	20%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 1

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	48.79	6.57	16%
Larkfield	10,472	52.41	53.12	0.72	1%
Meadowbrook	3,104	26.71	27.24	0.52	2%
Sacramento	239,173	29.08	28.34	-0.74	-3%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	59.31	9.43	19%
Larkfield	7,587	79.07	79.23	0.16	0%
Meadowbrook	4,632	35.66	38.33	2.67	7%
Sacramento	197,298	45.86	44.83	-1.02	-2%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	72.54	12.37	21%
Larkfield	3,149	113.06	112.71	-0.35	0%
Meadowbrook	3,802	45.20	51.03	5.83	13%
Sacramento	112,626	65.24	63.89	-1.34	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	86.91	15.47	22%
Larkfield	1,377	146.87	146.08	-0.79	-1%
Meadowbrook	2,776	55.13	65.72	10.60	19%
Sacramento	62,500	87.54	85.81	-1.73	-2%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	135.91	26.23	24%
Larkfield	1,157	252.74	250.68	-2.06	-1%
Meadowbrook	5,550	89.28	125.43	36.16	40%
Sacramento	76,902	161.01	158.02	-2.98	-2%

Northern Div. Scenario 1**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	50.20	6.74	16%
Larkfield	9,529	54.09	54.84	0.75	1%
Meadowbrook	2,988	26.98	27.51	0.53	2%
Sacramento	213,117	29.85	29.10	-0.75	-3%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,894	51.63	61.36	9.72	19%
Larkfield	7,027	80.71	80.88	0.18	0%
Meadowbrook	4,441	35.86	38.57	2.71	8%
Sacramento	169,396	47.35	46.30	-1.05	-2%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,237	62.04	74.74	12.70	20%
Larkfield	2,947	115.06	114.72	-0.34	0%
Meadowbrook	3,595	45.60	51.59	6.00	13%
Sacramento	95,462	67.50	66.11	-1.39	-2%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,632	73.65	89.53	15.88	22%
Larkfield	1,281	149.43	148.64	-0.79	-1%
Meadowbrook	2,637	55.54	66.42	10.88	20%
Sacramento	52,933	90.53	88.75	-1.79	-2%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,985	112.50	139.37	26.87	24%
Larkfield	1,076	258.01	255.90	-2.11	-1%
Meadowbrook	5,244	89.47	125.82	36.35	41%
Sacramento	66,410	165.46	162.39	-3.07	-2%

Northern Div. Scenario 1**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	35.01	4.89	16%
Larkfield	943	35.42	35.81	0.39	1%
Meadowbrook	116	19.79	20.22	0.43	2%
Sacramento	26,056	22.73	22.14	-0.60	-3%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	44.13	7.27	20%
Larkfield	560	58.57	58.53	-0.05	0%
Meadowbrook	191	31.05	32.82	1.77	6%
Sacramento	27,902	36.78	35.94	-0.84	-2%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	53.31	9.47	22%
Larkfield	202	83.84	83.34	-0.50	-1%
Meadowbrook	207	38.38	41.30	2.92	8%
Sacramento	17,164	52.66	51.56	-1.10	-2%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	62.99	11.73	23%
Larkfield	96	112.75	111.99	-0.76	-1%
Meadowbrook	139	47.39	52.54	5.15	11%
Sacramento	9,567	70.98	69.57	-1.41	-2%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	86.51	17.12	25%
Larkfield	81	182.81	181.39	-1.42	-1%
Meadowbrook	306	85.96	118.80	32.85	38%
Sacramento	10,492	132.83	130.40	-2.43	-2%

Northern Div. Scenario 2

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	80.86	16.96	27%
Larkfield	23,742	84.21	85.13	0.91	1%
Meadowbrook	19,864	53.79	66.97	13.18	25%
Sacramento	688,499	59.84	58.74	-1.10	-2%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	83.70	17.53	26%
Larkfield	21,860	86.49	87.47	0.98	1%
Meadowbrook	18,905	53.92	67.18	13.26	25%
Sacramento	597,318	61.29	60.18	-1.10	-2%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	53.83	11.46	27%
Larkfield	1,882	57.80	57.92	0.13	0%
Meadowbrook	959	51.16	62.81	11.65	23%
Sacramento	91,181	50.40	49.29	-1.11	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	408.51	111.43	38%
Larkfield	3,900	259.07	253.53	-5.55	-2%
Meadowbrook	724	331.78	406.10	74.32	22%
Sacramento	68,726	382.12	370.95	-11.18	-3%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	69.37	14.31	26%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 2

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	54.22	12.00	28%
Larkfield	10,472	52.41	56.14	3.74	7%
Meadowbrook	3,104	26.71	29.28	2.57	10%
Sacramento	239,173	29.08	30.26	1.19	4%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	63.39	13.52	27%
Larkfield	7,587	79.07	79.91	0.83	1%
Meadowbrook	4,632	35.66	39.77	4.11	12%
Sacramento	197,298	45.86	45.74	-0.12	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	76.13	15.95	27%
Larkfield	3,149	113.06	111.24	-1.82	-2%
Meadowbrook	3,802	45.20	51.72	6.52	14%
Sacramento	112,626	65.24	63.70	-1.54	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	90.11	18.67	26%
Larkfield	1,377	146.87	142.77	-4.10	-3%
Meadowbrook	2,776	55.13	65.50	10.38	19%
Sacramento	62,500	87.54	84.35	-3.18	-4%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	137.44	27.77	25%
Larkfield	1,157	252.74	242.00	-10.75	-4%
Meadowbrook	5,550	89.28	121.93	32.66	37%
Sacramento	76,902	161.01	152.60	-8.40	-5%

Northern Div. Scenario 2**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	55.79	12.33	28%
Larkfield	9,529	54.09	57.99	3.91	7%
Meadowbrook	2,988	26.98	29.57	2.59	10%
Sacramento	213,117	29.85	31.07	1.22	4%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	65.61	13.97	27%
Larkfield	7,027	80.71	81.63	0.92	1%
Meadowbrook	4,441	35.86	40.01	4.15	12%
Sacramento	169,396	47.35	47.24	-0.12	0%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	78.48	16.44	26%
Larkfield	2,947	115.06	113.30	-1.76	-2%
Meadowbrook	3,595	45.60	52.28	6.68	15%
Sacramento	95,462	67.50	65.92	-1.58	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	92.90	19.24	26%
Larkfield	1,281	149.43	145.32	-4.11	-3%
Meadowbrook	2,637	55.54	66.20	10.66	19%
Sacramento	52,933	90.53	87.24	-3.29	-4%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	140.97	28.48	25%
Larkfield	1,076	258.01	247.01	-11.00	-4%
Meadowbrook	5,244	89.47	122.34	32.87	37%
Sacramento	66,410	165.46	156.83	-8.63	-5%

Northern Div. Scenario 2**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	38.89	8.77	29%
Larkfield	943	35.42	37.43	2.00	6%
Meadowbrook	116	19.79	21.80	2.01	10%
Sacramento	26,056	22.73	23.64	0.91	4%
					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	391	36.86	47.03	10.17	28%
Larkfield	560	58.57	58.33	-0.24	0%
Meadowbrook	191	31.05	34.29	3.23	10%
Sacramento	27,902	36.78	36.63	-0.15	0%
					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	256	43.84	55.57	11.73	27%
Larkfield	202	83.84	81.23	-2.61	-3%
Meadowbrook	207	38.38	41.97	3.59	9%
Sacramento	17,164	52.66	51.37	-1.29	-2%
					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	179	51.26	64.68	13.42	26%
Larkfield	96	112.75	108.76	-3.99	-4%
Meadowbrook	139	47.39	52.32	4.94	10%
Sacramento	9,567	70.98	68.36	-2.62	-4%
					%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	209	69.39	87.01	17.62	25%
Larkfield	81	182.81	175.39	-7.42	-4%
Meadowbrook	306	85.96	115.02	29.07	34%
Sacramento	10,492	132.83	125.86	-6.97	-5%

Northern Div. Scenario 3

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	85.29	21.38	33%
Larkfield	23,742	84.21	85.98	1.77	2%
Meadowbrook	19,864	53.79	66.72	12.93	24%
Sacramento	688,499	59.84	58.93	-0.91	-2%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	88.27	22.10	33%
Larkfield	21,860	86.49	88.39	1.90	2%
Meadowbrook	18,905	53.92	66.95	13.03	24%
Sacramento	597,318	61.29	60.41	-0.88	-1%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	56.86	14.49	34%
Larkfield	1,882	57.80	58.05	0.25	0%
Meadowbrook	959	51.16	62.11	10.95	21%
Sacramento	91,181	50.40	49.24	-1.15	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	409.23	112.15	38%
Larkfield	3,900	259.07	248.32	-10.75	-4%
Meadowbrook	724	331.78	407.06	75.28	23%
Sacramento	68,726	382.12	366.79	-15.33	-4%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	73.11	18.04	33%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 3

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	60.52	18.30	43%
Larkfield	10,472	52.41	59.64	7.24	14%
Meadowbrook	3,104	26.71	31.65	4.94	18%
Sacramento	239,173	29.08	32.50	3.42	12%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,285	49.87	68.15	18.28	37%
Larkfield	7,587	79.07	80.69	1.61	2%
Meadowbrook	4,632	35.66	41.45	5.79	16%
Sacramento	197,298	45.86	46.79	0.93	2%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,493	60.17	80.31	20.13	33%
Larkfield	3,149	113.06	109.55	-3.52	-3%
Meadowbrook	3,802	45.20	52.52	7.32	16%
Sacramento	112,626	65.24	63.48	-1.76	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,811	71.44	93.85	22.41	31%
Larkfield	1,377	146.87	139.00	-7.87	-5%
Meadowbrook	2,776	55.13	65.25	10.13	18%
Sacramento	62,500	87.54	82.67	-4.87	-6%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,194	109.67	139.28	29.61	27%
Larkfield	1,157	252.74	231.85	-20.89	-8%
Meadowbrook	5,550	89.28	117.88	28.61	32%
Sacramento	76,902	161.01	146.33	-14.68	-9%

Northern Div. Scenario 3**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	62.27	18.81	43%
Larkfield	9,529	54.09	61.66	7.57	14%
Meadowbrook	2,988	26.98	31.97	4.98	18%
Sacramento	213,117	29.85	33.36	3.51	12%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	70.55	18.92	37%
Larkfield	7,027	80.71	82.49	1.78	2%
Meadowbrook	4,441	35.86	41.68	5.83	16%
Sacramento	169,396	47.35	48.33	0.97	2%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	82.84	20.79	34%
Larkfield	2,947	115.06	111.65	-3.41	-3%
Meadowbrook	3,595	45.60	53.08	7.49	16%
Sacramento	95,462	67.50	65.70	-1.80	-3%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	96.83	23.18	31%
Larkfield	1,281	149.43	141.53	-7.90	-5%
Meadowbrook	2,637	55.54	65.95	10.41	19%
Sacramento	52,933	90.53	85.51	-5.02	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	142.90	30.40	27%
Larkfield	1,076	258.01	236.64	-21.37	-8%
Meadowbrook	5,244	89.47	118.30	28.83	32%
Sacramento	66,410	165.46	150.39	-15.07	-9%

Northern Div. Scenario 3**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	43.39	13.27	44%
Larkfield	943	35.42	39.30	3.88	11%
Meadowbrook	116	19.79	23.63	3.84	19%
Sacramento	26,056	22.73	25.40	2.66	12%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	50.40	13.54	37%
Larkfield	560	58.57	58.11	-0.47	-1%
Meadowbrook	191	31.05	35.99	4.94	16%
Sacramento	27,902	36.78	37.44	0.66	2%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	58.21	14.37	33%
Larkfield	202	83.84	78.79	-5.06	-6%
Meadowbrook	207	38.38	42.75	4.37	11%
Sacramento	17,164	52.66	51.15	-1.51	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	66.67	15.41	30%
Larkfield	96	112.75	105.25	-7.50	-7%
Meadowbrook	139	47.39	52.08	4.69	10%
Sacramento	9,567	70.98	66.96	-4.02	-6%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	87.63	18.24	26%
Larkfield	81	182.81	168.25	-14.56	-8%
Meadowbrook	306	85.96	110.64	24.69	29%
Sacramento	10,492	132.83	120.59	-12.24	-9%

Northern Div. Scenario 4

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	89.74	25.84	40%
Larkfield	23,742	84.21	86.84	2.62	3%
Meadowbrook	19,864	53.79	66.48	12.69	24%
Sacramento	688,499	59.84	59.12	-0.72	-1%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	92.87	26.71	40%
Larkfield	21,860	86.49	89.30	2.82	3%
Meadowbrook	18,905	53.92	66.73	12.81	24%
Sacramento	597,318	61.29	60.64	-0.65	-1%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	59.91	17.54	41%
Larkfield	1,882	57.80	58.17	0.38	1%
Meadowbrook	959	51.16	61.41	10.25	20%
Sacramento	91,181	50.40	49.20	-1.20	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	410.19	113.11	38%
Larkfield	3,900	259.07	243.11	-15.96	-6%
Meadowbrook	724	331.78	408.01	76.23	23%
Sacramento	68,726	382.12	362.62	-19.50	-5%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	76.86	21.80	40%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 4

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	66.82	24.60	58%
Larkfield	10,472	52.41	63.14	10.74	20%
Meadowbrook	3,104	26.71	34.03	7.32	27%
Sacramento	239,173	29.08	34.73	5.66	19%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,285	49.87	72.92	23.05	46%
Larkfield	7,587	79.07	81.47	2.40	3%
Meadowbrook	4,632	35.66	43.13	7.47	21%
Sacramento	197,298	45.86	47.84	1.98	4%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,493	60.17	84.51	24.34	40%
Larkfield	3,149	113.06	107.85	-5.21	-5%
Meadowbrook	3,802	45.20	53.32	8.12	18%
Sacramento	112,626	65.24	63.27	-1.97	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,811	71.44	97.63	26.19	37%
Larkfield	1,377	146.87	135.29	-11.58	-8%
Meadowbrook	2,776	55.13	65.01	9.89	18%
Sacramento	62,500	87.54	81.00	-6.54	-7%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,194	109.67	141.20	31.52	29%
Larkfield	1,157	252.74	221.63	-31.12	-12%
Meadowbrook	5,550	89.28	113.85	24.57	28%
Sacramento	76,902	161.01	140.07	-20.94	-13%

Northern Div. Scenario 4**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	68.76	25.30	58%
Larkfield	9,529	54.09	65.32	11.23	21%
Meadowbrook	2,988	26.98	34.36	7.38	27%
Sacramento	213,117	29.85	35.66	5.81	19%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	75.51	23.88	46%
Larkfield	7,027	80.71	83.35	2.64	3%
Meadowbrook	4,441	35.86	43.36	7.51	21%
Sacramento	169,396	47.35	49.42	2.07	4%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	87.22	25.18	41%
Larkfield	2,947	115.06	110.01	-5.05	-4%
Meadowbrook	3,595	45.60	53.89	8.29	18%
Sacramento	95,462	67.50	65.49	-2.01	-3%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	100.80	27.15	37%
Larkfield	1,281	149.43	137.80	-11.63	-8%
Meadowbrook	2,637	55.54	65.71	10.17	18%
Sacramento	52,933	90.53	83.79	-6.74	-7%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	144.90	32.41	29%
Larkfield	1,076	258.01	226.20	-31.81	-12%
Meadowbrook	5,244	89.47	114.29	24.82	28%
Sacramento	66,410	165.46	143.98	-21.48	-13%

Northern Div. Scenario 4**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	47.89	17.78	59%
Larkfield	943	35.42	41.18	5.76	16%
Meadowbrook	116	19.79	25.46	5.67	29%
Sacramento	26,056	22.73	27.15	4.42	19%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	53.79	16.93	46%
Larkfield	560	58.57	57.88	-0.69	-1%
Meadowbrook	191	31.05	37.71	6.65	21%
Sacramento	27,902	36.78	38.25	1.47	4%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	60.88	17.03	39%
Larkfield	202	83.84	76.35	-7.49	-9%
Meadowbrook	207	38.38	43.53	5.15	13%
Sacramento	17,164	52.66	50.93	-1.73	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	68.69	17.43	34%
Larkfield	96	112.75	101.86	-10.88	-10%
Meadowbrook	139	47.39	51.86	4.47	9%
Sacramento	9,567	70.98	65.56	-5.42	-8%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	88.30	18.91	27%
Larkfield	81	182.81	160.91	-21.90	-12%
Meadowbrook	306	85.96	106.27	20.32	24%
Sacramento	10,492	132.83	115.32	-17.51	-13%

Northern Div. Scenario 5

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	94.22	30.32	47%
Larkfield	23,742	84.21	87.69	3.48	4%
Meadowbrook	19,864	53.79	66.24	12.45	23%
Sacramento	688,499	59.84	59.32	-0.52	-1%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	97.50	31.34	47%
Larkfield	21,860	86.49	90.23	3.74	4%
Meadowbrook	18,905	53.92	66.52	12.60	23%
Sacramento	597,318	61.29	60.88	-0.41	-1%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	62.98	20.61	49%
Larkfield	1,882	57.80	58.29	0.50	1%
Meadowbrook	959	51.16	60.72	9.57	19%
Sacramento	91,181	50.40	49.16	-1.23	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	411.42	114.34	38%
Larkfield	3,900	259.07	237.90	-21.18	-8%
Meadowbrook	724	331.78	408.95	77.17	23%
Sacramento	68,726	382.12	358.45	-23.67	-6%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	80.65	25.58	46%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 5

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	73.13	30.91	73%
Larkfield	10,472	52.41	66.64	14.24	27%
Meadowbrook	3,104	26.71	36.40	9.69	36%
Sacramento	239,173	29.08	36.97	7.89	27%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	77.71	27.84	56%
Larkfield	7,587	79.07	82.25	3.18	4%
Meadowbrook	4,632	35.66	44.82	9.17	26%
Sacramento	197,298	45.86	48.91	3.05	7%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	88.75	28.57	47%
Larkfield	3,149	113.06	106.18	-6.88	-6%
Meadowbrook	3,802	45.20	54.13	8.93	20%
Sacramento	112,626	65.24	63.06	-2.18	-3%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	101.44	30.00	42%
Larkfield	1,377	146.87	131.62	-15.25	-10%
Meadowbrook	2,776	55.13	64.78	9.66	18%
Sacramento	62,500	87.54	79.34	-8.20	-9%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	143.19	33.52	31%
Larkfield	1,157	252.74	211.32	-41.42	-16%
Meadowbrook	5,550	89.28	109.83	20.55	23%
Sacramento	76,902	161.01	133.83	-27.17	-17%

Northern Div. Scenario 5**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	75.24	31.79	73%
Larkfield	9,529	54.09	68.98	14.89	28%
Meadowbrook	2,988	26.98	36.76	9.78	36%
Sacramento	213,117	29.85	37.96	8.11	27%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,894	51.63	80.49	28.86	56%
Larkfield	7,027	80.71	84.21	3.50	4%
Meadowbrook	4,441	35.86	45.06	9.20	26%
Sacramento	169,396	47.35	50.53	3.17	7%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,237	62.04	91.63	29.59	48%
Larkfield	2,947	115.06	108.39	-6.67	-6%
Meadowbrook	3,595	45.60	54.70	9.10	20%
Sacramento	95,462	67.50	65.28	-2.22	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,632	73.65	104.81	31.16	42%
Larkfield	1,281	149.43	134.10	-15.32	-10%
Meadowbrook	2,637	55.54	65.48	9.94	18%
Sacramento	52,933	90.53	82.08	-8.45	-9%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,985	112.50	146.98	34.49	31%
Larkfield	1,076	258.01	215.68	-42.32	-16%
Meadowbrook	5,244	89.47	110.29	20.82	23%
Sacramento	66,410	165.46	137.59	-27.87	-17%

Northern Div. Scenario 5**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	52.40	22.29	74%
Larkfield	943	35.42	43.06	7.64	22%
Meadowbrook	116	19.79	27.29	7.50	38%
Sacramento	26,056	22.73	28.90	6.17	27%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	57.19	20.33	55%
Larkfield	560	58.57	57.66	-0.92	-2%
Meadowbrook	191	31.05	39.43	8.37	27%
Sacramento	27,902	36.78	39.07	2.29	6%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	63.56	19.72	45%
Larkfield	202	83.84	73.95	-9.89	-12%
Meadowbrook	207	38.38	44.31	5.93	15%
Sacramento	17,164	52.66	50.72	-1.94	-4%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	70.75	19.48	38%
Larkfield	96	112.75	98.48	-14.27	-13%
Meadowbrook	139	47.39	51.66	4.27	9%
Sacramento	9,567	70.98	64.18	-6.81	-10%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	89.03	19.64	28%
Larkfield	81	182.81	153.37	-29.44	-16%
Meadowbrook	306	85.96	101.91	15.96	19%
Sacramento	10,492	132.83	110.06	-22.77	-17%

Northern Div. Scenario 6

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	98.74	34.83	55%
Larkfield	23,742	84.21	88.55	4.34	5%
Meadowbrook	19,864	53.79	66.02	12.23	23%
Sacramento	688,499	59.84	59.53	-0.31	-1%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	102.17	36.00	54%
Larkfield	21,860	86.49	91.15	4.66	5%
Meadowbrook	18,905	53.92	66.32	12.40	23%
Sacramento	597,318	61.29	61.12	-0.16	0%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	66.07	23.70	56%
Larkfield	1,882	57.80	58.42	0.62	1%
Meadowbrook	959	51.16	60.04	8.89	17%
Sacramento	91,181	50.40	49.13	-1.27	-3%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	412.92	115.84	39%
Larkfield	3,900	259.07	232.67	-26.41	-10%
Meadowbrook	724	331.78	409.89	78.11	24%
Sacramento	68,726	382.12	354.28	-27.84	-7%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	84.46	29.39	53%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 6

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	79.44	37.21	88%
Larkfield	10,472	52.41	70.15	17.74	34%
Meadowbrook	3,104	26.71	38.78	12.07	45%
Sacramento	239,173	29.08	39.21	10.13	35%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,285	49.87	82.52	32.65	65%
Larkfield	7,587	79.07	83.03	3.96	5%
Meadowbrook	4,632	35.66	46.53	10.87	30%
Sacramento	197,298	45.86	49.98	4.12	9%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,493	60.17	93.01	32.84	55%
Larkfield	3,149	113.06	104.58	-8.48	-7%
Meadowbrook	3,802	45.20	54.95	9.74	22%
Sacramento	112,626	65.24	62.87	-2.37	-4%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,811	71.44	105.30	33.86	47%
Larkfield	1,377	146.87	127.87	-19.00	-13%
Meadowbrook	2,776	55.13	64.58	9.45	17%
Sacramento	62,500	87.54	77.69	-9.85	-11%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,194	109.67	145.27	35.60	32%
Larkfield	1,157	252.74	200.92	-51.82	-21%
Meadowbrook	5,550	89.28	105.83	16.56	19%
Sacramento	76,902	161.01	127.62	-33.39	-21%

Northern Div. Scenario 6**Average Non-CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	81.73	38.28	88%
Larkfield	9,529	54.09	72.64	18.56	34%
Meadowbrook	2,988	26.98	39.16	12.17	45%
Sacramento	213,117	29.85	40.26	10.40	35%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	85.48	33.85	66%
Larkfield	7,027	80.71	85.07	4.36	5%
Meadowbrook	4,441	35.86	46.76	10.90	30%
Sacramento	169,396	47.35	51.64	4.28	9%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	96.07	34.03	55%
Larkfield	2,947	115.06	106.84	-8.23	-7%
Meadowbrook	3,595	45.60	55.51	9.92	22%
Sacramento	95,462	67.50	65.09	-2.41	-4%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	108.86	35.21	48%
Larkfield	1,281	149.43	130.34	-19.08	-13%
Meadowbrook	2,637	55.54	65.27	9.74	18%
Sacramento	52,933	90.53	80.38	-10.15	-11%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	149.15	36.66	33%
Larkfield	1,076	258.01	205.08	-52.93	-21%
Meadowbrook	5,244	89.47	106.32	16.85	19%
Sacramento	66,410	165.46	131.23	-34.23	-21%

Northern Div. Scenario 6**Average CAP Residential Bill by Usage Range**

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	56.91	26.79	89%
Larkfield	943	35.42	44.94	9.52	27%
Meadowbrook	116	19.79	29.13	9.34	47%
Sacramento	26,056	22.73	30.66	7.93	35%
					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	391	36.86	60.60	23.74	64%
Larkfield	560	58.57	57.43	-1.14	-2%
Meadowbrook	191	31.05	41.15	10.10	33%
Sacramento	27,902	36.78	39.89	3.12	8%
					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	256	43.84	66.27	22.43	51%
Larkfield	202	83.84	71.73	-12.11	-14%
Meadowbrook	207	38.38	45.10	6.72	18%
Sacramento	17,164	52.66	50.52	-2.14	-4%
					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	179	51.26	72.83	21.57	42%
Larkfield	96	112.75	94.89	-17.86	-16%
Meadowbrook	139	47.39	51.46	4.07	9%
Sacramento	9,567	70.98	62.80	-8.18	-12%
					%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	209	69.39	89.82	20.43	29%
Larkfield	81	182.81	145.65	-37.16	-20%
Meadowbrook	306	85.96	97.57	11.61	14%
Sacramento	10,492	132.83	104.81	-28.02	-21%

Northern Division Technical Memorandum #2

Date: April 18, 2022

To: Jeffrey Linam

Fr: David Mitchell

Re: Northern Division Bill Impact Follow-On Scenarios

1 Introduction

This memorandum presents results for five follow-on scenarios to our April 13 analysis of six Northern Division partial rate consolidation and fixed cost recovery scenarios. The original and follow-on scenarios are summarized in Table 1.

Table 1. Northern Division Bill Impact Scenarios

Scenario	Scenario Category	Fixed cost from meter charge	Meter Charge Consolidation	Rate Design Consolidation	SQR
Current		36%	All districts	Sacramento, Meadowbrook, Fruitridge	Mead & Fruit SQR is 70% of Sac SQR
Scenario 1	Original	36%			
Scenario 2	Original	40%			
Scenario 3	Original	45%			
Scenario 4	Original	50%			
Scenario 5	Original	55%			
Scenario 6	Original	60%			
Scenario 7	Follow-On	50%			Mead & Fruit SQR is 50% of Sac SQR
Scenario 8	Follow-On	50%			Mead SQR is 50% & Fruit SQR is 45% of Sac SQR
Scenario 9	Follow-On	50%	Sacramento, Meadowbrook, and Larkfield	Sacramento & Meadowbrook Only	Mead & Fruit SQR is 45% of Sac SQR
Scenario 10	Follow-On	50%			Mead SQR is 50% of Sac SQR
Scenario 11	Follow-On	50%	Sacramento and Larkfield Only	No Consolidation	No change to Mead & Fruit rates

The following is noted regarding the follow-on scenarios and presentation of results:

- All five follow-on scenarios recover 50% of Central Division fixed costs from meter charges, the same as the original Scenario 4. In the remaining tables, the follow-on scenarios are compared to the current rate design and Scenario 4. The results for the other scenarios are not reproduced in this memorandum.

- Meter charges are consolidated for:
 - All districts in Scenarios 7-9
 - All districts but Fruitridge in Scenario 10
 - Only Sacramento and Larkfield in Scenario 11
- Number and width of tiers are consolidated for:
 - All districts but Larkfield in Scenarios 7-9
 - Only Sacramento and Meadowbrook in Scenario 10
 - No districts in Scenario 11
- Meadowbrook and Fruitridge SQRs are scaled to Sacramento's as follows:
 - Scenario 7: 50%
 - Scenario 8: Meadowbrook 50%, Fruitridge 45%
 - Scenario 9: 45%
 - Scenario 10: Meadowbrook 50%

As with the original scenarios, the following restrictions are imposed:

- Northern Division sales revenue must equal revenue requirement
- Meter charge revenue recovers portion of Northern Division fixed costs specified by the user
- Larkfield's sales revenue is kept constant at its current level
- The non-residential rate in each district is set to the district's SQR

2 Model Results: Standard Meter Charge and SQRs

Tables 2 and 3 show the standard meter charge and the SQRs by scenario, respectively.

Table 2. Standard Meter Charge by Fixed Cost Recovery Scenario

Scenario	Fixed from Meter	Meter Charge Consolidation	Rate Design Consolidation	SQR Scaling	Standard Meter Charge			
					Fruit.	Lark.	Mead.	Sac.
Current	36%	<i>None</i>	<i>None</i>		15.58	17.30	19.02	18.43
Scenario 4	50%	All	All but Lark.	70% of Sac.	25.71	25.71	25.71	25.71
Scenario 7	50%	All	All but Lark.	50% of Sac.	25.88	25.88	25.88	25.88
Scenario 8	50%	All	All but Lark.	Mead. 50%/Fruit. 45% of Sac.	25.93	25.93	25.93	25.93
Scenario 9	50%	All	All but Lark.	45% of Sac.	25.93	25.93	25.93	25.93
Scenario 10	50%	All but Fruit.	Sac. & Mead. only	Mead. 50% of Sac.	15.58	27.07	27.07	27.07
Scenario 11	50%	Sac & Lark. only	None	None	15.58	27.25	19.02	27.25

Table 3. SQRs by Fixed Cost Recovery Scenario

Scenario	Fixed from Meter	Meter Charge Consolidation	Rate Design Consolidation	SQR Scaling	SQR			
					Fruit.	Lark.	Mead.	Sac.
Current	36%	<i>None</i>	<i>None</i>		1.7994	6.7359	1.8383	4.0038
Scenario 4	50%	All	All but Lark.	70% of Sac.	2.1668	4.4938	2.1668	3.0954
Scenario 7	50%	All	All but Lark.	50% of Sac.	1.5744	4.4500	1.5744	3.1488
Scenario 8	50%	All	All but Lark.	Mead. 50%/Fruit. 45% of Sac.	1.4207	4.4386	1.5786	3.1571
Scenario 9	50%	All	All but Lark.	45% of Sac.	1.4232	4.4388	1.4232	3.1627
Scenario 10	50%	All but Fruit.	Sac. & Mead. only	Mead. 50% of Sac.	1.7994	4.1623	1.5693	3.1385
Scenario 11	50%	Sac & Lark. only	None	None	1.7994	4.1175	1.8383	3.1308

3 Model Results: Water Sales

Table 4 shows the estimated change in Northern Division water sales by scenario. Impacts are especially large for Larkfield. This occurs because of the revenue constraint that holds Larkfield's revenue requirement constant across the scenarios. As the standardized meter charge increases, Larkfield's SQR must be adjusted down significantly to satisfy that constraint which in turn incentivizes greater water use.

The sales increases reported in Table 4 are predicated on net revenue neutrality and thus are measuring only the impact of the rate design on water use. Increases in the net revenue requirement due to rising operating costs will work in the opposite direction. The bill impact model indicates that Northern Division water use would not change under Cal Am's proposed rates. In other words, the increase in water use due to the change in the rate design would be fully offset by the decrease in sales due to the higher revenue requirement.

Table 4. Change in Northern Division Water Sales by Scenario

Scenario	Fixed Cost Recovered	Fruitridge	Larkfield	Meadowbrook	Sacramento	Total
Scenario 4	50%	-1%	15%	-2%	3%	3%
Scenario 7	50%	1%	16%	2%	3%	3%
Scenario 8	50%	1%	16%	2%	3%	3%
Scenario 9	50%	1%	16%	3%	3%	3%
Scenario 10	50%	0%	18%	2%	3%	3%
Scenario 11	50%	0%	19%	0%	3%	3%

4 Model Results: Bill Impacts

Bill impacts associated with each scenario are shown in the following tables. Impacts are shown for:

- The average residential bill
- The average non-CAP and CAP residential bills overall and by usage level
- The average non-residential bill

Water usage percentiles for each district are provided in Table 5 for reference. These may be useful in conjunction with the bill impacts by customer usage level.

Table 5. District Usage Percentiles in CCF

District	P01	P05	P10	P25	P50	P75	P90	P95	P99
Fruitridge	0	0	0	4	10	18	30	39	79
Larkfield	0	1	2	4	6	10	16	20	36
Meadowbrook	0	3	4	7	13	22	33	43	76
Sacramento	0	0	1	4	8	14	21	28	46
Total	0	0	1	4	8	14	22	28	47

Northern Div. Scenario 4

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	89.74	25.84	40%
Larkfield	23,742	84.21	86.84	2.62	3%
Meadowbrook	19,864	53.79	66.48	12.69	24%
Sacramento	688,499	59.84	59.12	-0.72	-1%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	92.87	26.71	40%
Larkfield	21,860	86.49	89.30	2.82	3%
Meadowbrook	18,905	53.92	66.73	12.81	24%
Sacramento	597,318	61.29	60.64	-0.65	-1%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	59.91	17.54	41%
Larkfield	1,882	57.80	58.17	0.38	1%
Meadowbrook	959	51.16	61.41	10.25	20%
Sacramento	91,181	50.40	49.20	-1.20	-2%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	410.19	113.11	38%
Larkfield	3,900	259.07	243.11	-15.96	-6%
Meadowbrook	724	331.78	408.01	76.23	23%
Sacramento	68,726	382.12	362.62	-19.50	-5%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	76.86	21.80	40%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 4

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	66.82	24.60	58%
Larkfield	10,472	52.41	63.14	10.74	20%
Meadowbrook	3,104	26.71	34.03	7.32	27%
Sacramento	239,173	29.08	34.73	5.66	19%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	72.92	23.05	46%
Larkfield	7,587	79.07	81.47	2.40	3%
Meadowbrook	4,632	35.66	43.13	7.47	21%
Sacramento	197,298	45.86	47.84	1.98	4%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	84.51	24.34	40%
Larkfield	3,149	113.06	107.85	-5.21	-5%
Meadowbrook	3,802	45.20	53.32	8.12	18%
Sacramento	112,626	65.24	63.27	-1.97	-3%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	97.63	26.19	37%
Larkfield	1,377	146.87	135.29	-11.58	-8%
Meadowbrook	2,776	55.13	65.01	9.89	18%
Sacramento	62,500	87.54	81.00	-6.54	-7%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	141.20	31.52	29%
Larkfield	1,157	252.74	221.63	-31.12	-12%
Meadowbrook	5,550	89.28	113.85	24.57	28%
Sacramento	76,902	161.01	140.07	-20.94	-13%

Northern Div. Scenario 4

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	68.76	25.30	58%
Larkfield	9,529	54.09	65.32	11.23	21%
Meadowbrook	2,988	26.98	34.36	7.38	27%
Sacramento	213,117	29.85	35.66	5.81	19%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,894	51.63	75.51	23.88	46%
Larkfield	7,027	80.71	83.35	2.64	3%
Meadowbrook	4,441	35.86	43.36	7.51	21%
Sacramento	169,396	47.35	49.42	2.07	4%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,237	62.04	87.22	25.18	41%
Larkfield	2,947	115.06	110.01	-5.05	-4%
Meadowbrook	3,595	45.60	53.89	8.29	18%
Sacramento	95,462	67.50	65.49	-2.01	-3%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,632	73.65	100.80	27.15	37%
Larkfield	1,281	149.43	137.80	-11.63	-8%
Meadowbrook	2,637	55.54	65.71	10.17	18%
Sacramento	52,933	90.53	83.79	-6.74	-7%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,985	112.50	144.90	32.41	29%
Larkfield	1,076	258.01	226.20	-31.81	-12%
Meadowbrook	5,244	89.47	114.29	24.82	28%
Sacramento	66,410	165.46	143.98	-21.48	-13%

Northern Div. Scenario 4

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	47.89	17.78	59%
Larkfield	943	35.42	41.18	5.76	16%
Meadowbrook	116	19.79	25.46	5.67	29%
Sacramento	26,056	22.73	27.15	4.42	19%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	391	36.86	53.79	16.93	46%
Larkfield	560	58.57	57.88	-0.69	-1%
Meadowbrook	191	31.05	37.71	6.65	21%
Sacramento	27,902	36.78	38.25	1.47	4%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	256	43.84	60.88	17.03	39%
Larkfield	202	83.84	76.35	-7.49	-9%
Meadowbrook	207	38.38	43.53	5.15	13%
Sacramento	17,164	52.66	50.93	-1.73	-3%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	179	51.26	68.69	17.43	34%
Larkfield	96	112.75	101.86	-10.88	-10%
Meadowbrook	139	47.39	51.86	4.47	9%
Sacramento	9,567	70.98	65.56	-5.42	-8%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	209	69.39	88.30	18.91	27%
Larkfield	81	182.81	160.91	-21.90	-12%
Meadowbrook	306	85.96	106.27	20.32	24%
Sacramento	10,492	132.83	115.32	-17.51	-13%

Northern Div. Scenario 7

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	83.35	19.44	30%
Larkfield	23,742	84.21	86.89	2.68	3%
Meadowbrook	19,864	53.79	57.24	3.45	6%
Sacramento	688,499	59.84	59.79	-0.05	0%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	86.25	20.09	30%
Larkfield	21,860	86.49	89.36	2.88	3%
Meadowbrook	18,905	53.92	57.50	3.58	7%
Sacramento	597,318	61.29	61.32	0.03	0%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	55.64	13.27	31%
Larkfield	1,882	57.80	58.18	0.39	1%
Meadowbrook	959	51.16	52.13	0.97	2%
Sacramento	91,181	50.40	49.77	-0.62	-1%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	353.10	56.02	19%
Larkfield	3,900	259.07	242.78	-16.30	-6%
Meadowbrook	724	331.78	354.65	22.87	7%
Sacramento	68,726	382.12	366.92	-15.21	-4%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	71.47	16.40	30%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 7

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	66.30	24.08	57%
Larkfield	10,472	52.41	63.37	10.96	21%
Meadowbrook	3,104	26.71	32.74	6.02	23%
Sacramento	239,173	29.08	35.03	5.95	20%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	69.38	19.51	39%
Larkfield	7,587	79.07	81.52	2.45	3%
Meadowbrook	4,632	35.66	39.67	4.01	11%
Sacramento	197,298	45.86	48.34	2.49	5%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	78.52	18.34	30%
Larkfield	3,149	113.06	107.74	-5.32	-5%
Meadowbrook	3,802	45.20	47.30	2.10	5%
Sacramento	112,626	65.24	64.00	-1.24	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	89.15	17.71	25%
Larkfield	1,377	146.87	135.06	-11.81	-8%
Meadowbrook	2,776	55.13	56.00	0.87	2%
Sacramento	62,500	87.54	82.00	-5.53	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	123.88	14.21	13%
Larkfield	1,157	252.74	220.96	-31.78	-13%
Meadowbrook	5,550	89.28	93.05	3.78	4%
Sacramento	76,902	161.01	141.96	-19.05	-12%

Northern Div. Scenario 7

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	68.24	24.78	57%
Larkfield	9,529	54.09	65.55	11.47	21%
Meadowbrook	2,988	26.98	33.06	6.08	23%
Sacramento	213,117	29.85	35.96	6.11	20%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	71.88	20.25	39%
Larkfield	7,027	80.71	83.40	2.70	3%
Meadowbrook	4,441	35.86	39.88	4.02	11%
Sacramento	169,396	47.35	49.94	2.58	5%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	81.10	19.06	31%
Larkfield	2,947	115.06	109.91	-5.16	-4%
Meadowbrook	3,595	45.60	47.80	2.20	5%
Sacramento	95,462	67.50	66.24	-1.26	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	92.16	18.51	25%
Larkfield	1,281	149.43	137.56	-11.87	-8%
Meadowbrook	2,637	55.54	56.60	1.07	2%
Sacramento	52,933	90.53	84.83	-5.70	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	127.19	14.70	13%
Larkfield	1,076	258.01	225.51	-32.49	-13%
Meadowbrook	5,244	89.47	93.47	4.00	4%
Sacramento	66,410	165.46	145.92	-19.54	-12%

Northern Div. Scenario 7

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	47.38	17.27	57%
Larkfield	943	35.42	41.30	5.88	17%
Meadowbrook	116	19.79	24.44	4.65	23%
Sacramento	26,056	22.73	27.39	4.66	20%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	50.86	14.00	38%
Larkfield	560	58.57	57.87	-0.71	-1%
Meadowbrook	191	31.05	34.85	3.80	12%
Sacramento	27,902	36.78	38.66	1.89	5%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	55.92	12.08	28%
Larkfield	202	83.84	76.19	-7.65	-9%
Meadowbrook	207	38.38	38.64	0.26	1%
Sacramento	17,164	52.66	51.53	-1.13	-2%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	61.72	10.46	20%
Larkfield	96	112.75	101.65	-11.10	-10%
Meadowbrook	139	47.39	44.52	-2.87	-6%
Sacramento	9,567	70.98	66.39	-4.60	-6%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	76.63	7.24	10%
Larkfield	81	182.81	160.42	-22.39	-12%
Meadowbrook	306	85.96	85.98	0.02	0%
Sacramento	10,492	132.83	116.88	-15.95	-12%

Northern Div. Scenario 8

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	81.69	17.78	28%
Larkfield	23,742	84.21	86.91	2.69	3%
Meadowbrook	19,864	53.79	57.36	3.57	7%
Sacramento	688,499	59.84	59.91	0.07	0%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	84.54	18.37	28%
Larkfield	21,860	86.49	89.38	2.89	3%
Meadowbrook	18,905	53.92	57.62	3.70	7%
Sacramento	597,318	61.29	61.45	0.16	0%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	54.53	12.16	29%
Larkfield	1,882	57.80	58.18	0.39	1%
Meadowbrook	959	51.16	52.23	1.08	2%
Sacramento	91,181	50.40	49.88	-0.52	-1%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	338.29	41.21	14%
Larkfield	3,900	259.07	242.69	-16.39	-6%
Meadowbrook	724	331.78	355.36	23.58	7%
Sacramento	68,726	382.12	367.67	-14.45	-4%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	70.07	15.00	27%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 8

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	66.17	23.95	57%
Larkfield	10,472	52.41	63.43	11.02	21%
Meadowbrook	3,104	26.71	32.80	6.08	23%
Sacramento	239,173	29.08	35.09	6.01	21%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	68.46	18.58	37%
Larkfield	7,587	79.07	81.53	2.46	3%
Meadowbrook	4,632	35.66	39.74	4.08	11%
Sacramento	197,298	45.86	48.44	2.58	6%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	76.96	16.79	28%
Larkfield	3,149	113.06	107.71	-5.35	-5%
Meadowbrook	3,802	45.20	47.39	2.19	5%
Sacramento	112,626	65.24	64.13	-1.10	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	86.95	15.51	22%
Larkfield	1,377	146.87	135.00	-11.87	-8%
Meadowbrook	2,776	55.13	56.11	0.98	2%
Sacramento	62,500	87.54	82.18	-5.36	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	119.39	9.72	9%
Larkfield	1,157	252.74	220.78	-31.96	-13%
Meadowbrook	5,550	89.28	93.25	3.97	4%
Sacramento	76,902	161.01	142.27	-18.74	-12%

Northern Div. Scenario 8

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	68.10	24.64	57%
Larkfield	9,529	54.09	65.62	11.53	21%
Meadowbrook	2,988	26.98	33.12	6.14	23%
Sacramento	213,117	29.85	36.03	6.17	21%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	70.94	19.31	37%
Larkfield	7,027	80.71	83.42	2.71	3%
Meadowbrook	4,441	35.86	39.95	4.09	11%
Sacramento	169,396	47.35	50.04	2.68	6%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	79.52	17.47	28%
Larkfield	2,947	115.06	109.88	-5.19	-5%
Meadowbrook	3,595	45.60	47.89	2.30	5%
Sacramento	95,462	67.50	66.38	-1.12	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	89.92	16.27	22%
Larkfield	1,281	149.43	137.50	-11.93	-8%
Meadowbrook	2,637	55.54	56.72	1.18	2%
Sacramento	52,933	90.53	85.01	-5.52	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	122.60	10.10	9%
Larkfield	1,076	258.01	225.34	-32.67	-13%
Meadowbrook	5,244	89.47	93.66	4.19	5%
Sacramento	66,410	165.46	146.24	-19.21	-12%

Northern Div. Scenario 8

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	47.25	17.14	57%
Larkfield	943	35.42	41.34	5.91	17%
Meadowbrook	116	19.79	24.48	4.70	24%
Sacramento	26,056	22.73	27.44	4.71	21%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	391	36.86	50.10	13.25	36%
Larkfield	560	58.57	57.86	-0.71	-1%
Meadowbrook	191	31.05	34.92	3.87	12%
Sacramento	27,902	36.78	38.74	1.97	5%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	256	43.84	54.63	10.79	25%
Larkfield	202	83.84	76.15	-7.69	-9%
Meadowbrook	207	38.38	38.72	0.34	1%
Sacramento	17,164	52.66	51.64	-1.02	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	179	51.26	59.91	8.64	17%
Larkfield	96	112.75	101.60	-11.15	-10%
Meadowbrook	139	47.39	44.61	-2.78	-6%
Sacramento	9,567	70.98	66.53	-4.45	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	209	69.39	73.60	4.21	6%
Larkfield	81	182.81	160.30	-22.51	-12%
Meadowbrook	306	85.96	86.16	0.21	0%
Sacramento	10,492	132.83	117.13	-15.70	-12%

Northern Div. Scenario 9

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	81.71	17.81	28%
Larkfield	23,742	84.21	86.91	2.69	3%
Meadowbrook	19,864	53.79	54.83	1.04	2%
Sacramento	688,499	59.84	59.96	0.12	0%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	84.56	18.40	28%
Larkfield	21,860	86.49	89.38	2.89	3%
Meadowbrook	18,905	53.92	55.09	1.17	2%
Sacramento	597,318	61.29	61.50	0.21	0%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	54.55	12.18	29%
Larkfield	1,882	57.80	58.18	0.39	1%
Meadowbrook	959	51.16	49.69	-1.47	-3%
Sacramento	91,181	50.40	49.92	-0.47	-1%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	338.53	41.45	14%
Larkfield	3,900	259.07	242.69	-16.38	-6%
Meadowbrook	724	331.78	340.58	8.80	3%
Sacramento	68,726	382.12	368.03	-14.09	-4%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	70.09	15.03	27%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 9

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	66.17	23.95	57%
Larkfield	10,472	52.41	63.43	11.02	21%
Meadowbrook	3,104	26.71	32.40	5.69	21%
Sacramento	239,173	29.08	35.10	6.03	21%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	68.47	18.60	37%
Larkfield	7,587	79.07	81.53	2.46	3%
Meadowbrook	4,632	35.66	38.76	3.11	9%
Sacramento	197,298	45.86	48.47	2.62	6%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	76.99	16.81	28%
Larkfield	3,149	113.06	107.71	-5.35	-5%
Meadowbrook	3,802	45.20	45.72	0.52	1%
Sacramento	112,626	65.24	64.19	-1.05	-2%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	86.99	15.55	22%
Larkfield	1,377	146.87	135.00	-11.87	-8%
Meadowbrook	2,776	55.13	53.64	-1.48	-3%
Sacramento	62,500	87.54	82.26	-5.27	-6%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	119.46	9.79	9%
Larkfield	1,157	252.74	220.79	-31.96	-13%
Meadowbrook	5,550	89.28	87.61	-1.67	-2%
Sacramento	76,902	161.01	142.45	-18.56	-12%

Northern Div. Scenario 9

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	68.10	24.65	57%
Larkfield	9,529	54.09	65.62	11.53	21%
Meadowbrook	2,988	26.98	32.72	5.74	21%
Sacramento	213,117	29.85	36.04	6.19	21%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,894	51.63	70.95	19.32	37%
Larkfield	7,027	80.71	83.42	2.71	3%
Meadowbrook	4,441	35.86	38.96	3.11	9%
Sacramento	169,396	47.35	50.07	2.72	6%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,237	62.04	79.54	17.50	28%
Larkfield	2,947	115.06	109.88	-5.19	-5%
Meadowbrook	3,595	45.60	46.21	0.61	1%
Sacramento	95,462	67.50	66.44	-1.06	-2%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,632	73.65	89.96	16.30	22%
Larkfield	1,281	149.43	137.50	-11.93	-8%
Meadowbrook	2,637	55.54	54.22	-1.31	-2%
Sacramento	52,933	90.53	85.10	-5.44	-6%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,985	112.50	122.67	10.18	9%
Larkfield	1,076	258.01	225.34	-32.67	-13%
Meadowbrook	5,244	89.47	88.01	-1.46	-2%
Sacramento	66,410	165.46	146.43	-19.03	-12%

Northern Div. Scenario 9

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	47.25	17.14	57%
Larkfield	943	35.42	41.33	5.91	17%
Meadowbrook	116	19.79	24.17	4.38	22%
Sacramento	26,056	22.73	27.45	4.72	21%
					%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	391	36.86	50.11	13.26	36%
Larkfield	560	58.57	57.86	-0.71	-1%
Meadowbrook	191	31.05	34.11	3.06	10%
Sacramento	27,902	36.78	38.77	1.99	5%
					%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	256	43.84	54.66	10.81	25%
Larkfield	202	83.84	76.15	-7.69	-9%
Meadowbrook	207	38.38	37.36	-1.02	-3%
Sacramento	17,164	52.66	51.69	-0.97	-2%
					%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	179	51.26	59.94	8.67	17%
Larkfield	96	112.75	101.60	-11.15	-10%
Meadowbrook	139	47.39	42.59	-4.79	-10%
Sacramento	9,567	70.98	66.60	-4.38	-6%
					%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	209	69.39	73.65	4.26	6%
Larkfield	81	182.81	160.30	-22.51	-12%
Meadowbrook	306	85.96	80.65	-5.31	-6%
Sacramento	10,492	132.83	117.28	-15.55	-12%

Northern Div. Scenario 10

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	63.91	0.00	0%
Larkfield	23,742	84.21	87.26	3.05	4%
Meadowbrook	19,864	53.79	58.40	4.62	9%
Sacramento	688,499	59.84	60.90	1.06	2%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	66.17	0.00	0%
Larkfield	21,860	86.49	89.76	3.27	4%
Meadowbrook	18,905	53.92	58.67	4.75	9%
Sacramento	597,318	61.29	62.47	1.18	2%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	42.37	0.00	0%
Larkfield	1,882	57.80	58.23	0.44	1%
Meadowbrook	959	51.16	53.09	1.93	4%
Sacramento	91,181	50.40	50.66	0.26	1%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	297.08	0.00	0%
Larkfield	3,900	259.07	240.53	-18.55	-7%
Meadowbrook	724	331.78	362.33	30.55	9%
Sacramento	68,726	382.12	372.28	-9.84	-3%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	55.06	0.00	0%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 10

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	42.22	0.00	0%
Larkfield	10,472	52.41	64.88	12.47	24%
Meadowbrook	3,104	26.71	33.96	7.25	27%
Sacramento	239,173	29.08	36.22	7.15	25%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	49.87	0.00	0%
Larkfield	7,587	79.07	81.86	2.78	4%
Meadowbrook	4,632	35.66	40.89	5.23	15%
Sacramento	197,298	45.86	49.48	3.62	8%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	60.17	0.00	0%
Larkfield	3,149	113.06	107.01	-6.05	-5%
Meadowbrook	3,802	45.20	48.48	3.28	7%
Sacramento	112,626	65.24	65.08	-0.16	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	71.44	0.00	0%
Larkfield	1,377	146.87	133.48	-13.39	-9%
Meadowbrook	2,776	55.13	57.13	2.01	4%
Sacramento	62,500	87.54	83.03	-4.51	-5%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	109.67	0.00	0%
Larkfield	1,157	252.74	216.53	-36.21	-14%
Meadowbrook	5,550	89.28	94.13	4.85	5%
Sacramento	76,902	161.01	142.87	-18.14	-11%

Northern Div. Scenario 10

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	43.46	0.00	0%
Larkfield	9,529	54.09	67.13	13.05	24%
Meadowbrook	2,988	26.98	34.29	7.31	27%
Sacramento	213,117	29.85	37.19	7.34	25%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,894	51.63	51.63	0.00	0%
Larkfield	7,027	80.71	83.77	3.07	4%
Meadowbrook	4,441	35.86	41.10	5.24	15%
Sacramento	169,396	47.35	51.11	3.76	8%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,237	62.04	62.04	0.00	0%
Larkfield	2,947	115.06	109.20	-5.87	-5%
Meadowbrook	3,595	45.60	48.99	3.39	7%
Sacramento	95,462	67.50	67.36	-0.14	0%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,632	73.65	73.65	0.00	0%
Larkfield	1,281	149.43	135.98	-13.45	-9%
Meadowbrook	2,637	55.54	57.75	2.22	4%
Sacramento	52,933	90.53	85.89	-4.64	-5%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	2,985	112.50	112.50	0.00	0%
Larkfield	1,076	258.01	220.99	-37.01	-14%
Meadowbrook	5,244	89.47	94.55	5.08	6%
Sacramento	66,410	165.46	146.86	-18.60	-11%

Northern Div. Scenario 10

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	30.11	0.00	0%
Larkfield	943	35.42	42.11	6.69	19%
Meadowbrook	116	19.79	25.39	5.60	28%
Sacramento	26,056	22.73	28.34	5.61	25%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	36.86	0.00	0%
Larkfield	560	58.57	57.77	-0.80	-1%
Meadowbrook	191	31.05	36.00	4.95	16%
Sacramento	27,902	36.78	39.58	2.80	8%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	43.84	0.00	0%
Larkfield	202	83.84	75.14	-8.70	-10%
Meadowbrook	207	38.38	39.66	1.27	3%
Sacramento	17,164	52.66	52.41	-0.25	0%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	51.26	0.00	0%
Larkfield	96	112.75	100.21	-12.54	-11%
Meadowbrook	139	47.39	45.43	-1.95	-4%
Sacramento	9,567	70.98	67.22	-3.76	-5%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	69.39	0.00	0%
Larkfield	81	182.81	157.20	-25.61	-14%
Meadowbrook	306	85.96	86.83	0.87	1%
Sacramento	10,492	132.83	117.58	-15.25	-11%

Northern Div. Scenario 11

Average Bill

Residential - All	Bills	Baseline	New	Difference	% Difference
Fruitridge	15,598	63.91	63.91	0.00	0%
Larkfield	23,742	84.21	87.32	3.11	4%
Meadowbrook	19,864	53.79	53.79	0.00	0%
Sacramento	688,499	59.84	61.02	1.18	2%

Residential - Non-CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	14,117	66.17	66.17	0.00	0%
Larkfield	21,860	86.49	89.82	3.34	4%
Meadowbrook	18,905	53.92	53.92	0.00	0%
Sacramento	597,318	61.29	62.59	1.31	2%

Residential - CAP	Bills	Baseline	New	Difference	% Difference
Fruitridge	1,481	42.37	42.37	0.00	0%
Larkfield	1,882	57.80	58.24	0.45	1%
Meadowbrook	959	51.16	51.16	0.00	0%
Sacramento	91,181	50.40	50.75	0.35	1%

Non-Residential	Bills	Baseline	New	Difference	% Difference
Fruitridge	3,816	297.08	297.08	0.00	0%
Larkfield	3,900	259.07	240.17	-18.90	-7%
Meadowbrook	724	331.78	331.78	0.00	0%
Sacramento	68,726	382.12	372.74	-9.39	-2%

Private Fire Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	409	10.73	10.73	0.00	0%
Larkfield	516	41.18	41.18	0.00	0%
Meadowbrook	143	17.58	17.58	0.00	0%
Sacramento	8,823	57.31	57.31	0.00	0%

Flat Service	Bills	Baseline	New	Difference	% Difference
Fruitridge	39,223	55.06	55.06	0.00	0%
Larkfield	0	0.00	0.00	0.00	0%
Meadowbrook	0	0.00	0.00	0.00	0%
Sacramento	0	0.00	0.00	0.00	0%

Northern Div. Scenario 11

Average Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,815	42.22	42.22	0.00	0%
Larkfield	10,472	52.41	65.12	12.71	24%
Meadowbrook	3,104	26.71	26.71	0.00	0%
Sacramento	239,173	29.08	36.40	7.32	25%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,285	49.87	49.87	0.00	0%
Larkfield	7,587	79.07	81.91	2.84	4%
Meadowbrook	4,632	35.66	35.66	0.00	0%
Sacramento	197,298	45.86	49.62	3.76	8%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,493	60.17	60.17	0.00	0%
Larkfield	3,149	113.06	106.90	-6.16	-5%
Meadowbrook	3,802	45.20	45.20	0.00	0%
Sacramento	112,626	65.24	65.19	-0.05	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,811	71.44	71.44	0.00	0%
Larkfield	1,377	146.87	133.23	-13.64	-9%
Meadowbrook	2,776	55.13	55.13	0.00	0%
Sacramento	62,500	87.54	83.10	-4.44	-5%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	3,194	109.67	109.67	0.00	0%
Larkfield	1,157	252.74	215.83	-36.92	-15%
Meadowbrook	5,550	89.28	89.28	0.00	0%
Sacramento	76,902	161.01	142.81	-18.19	-11%

Northern Div. Scenario 11

Average Non-CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	4,369	43.46	43.46	0.00	0%
Larkfield	9,529	54.09	67.38	13.30	25%
Meadowbrook	2,988	26.98	26.98	0.00	0%
Sacramento	213,117	29.85	37.37	7.52	25%
6-10 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,894	51.63	51.63	0.00	0%
Larkfield	7,027	80.71	83.83	3.13	4%
Meadowbrook	4,441	35.86	35.86	0.00	0%
Sacramento	169,396	47.35	51.26	3.90	8%
11-15 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,237	62.04	62.04	0.00	0%
Larkfield	2,947	115.06	109.09	-5.98	-5%
Meadowbrook	3,595	45.60	45.60	0.00	0%
Sacramento	95,462	67.50	67.47	-0.03	0%
16-20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	1,632	73.65	73.65	0.00	0%
Larkfield	1,281	149.43	135.72	-13.70	-9%
Meadowbrook	2,637	55.54	55.54	0.00	0%
Sacramento	52,933	90.53	85.96	-4.57	-5%
>20 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	2,985	112.50	112.50	0.00	0%
Larkfield	1,076	258.01	220.28	-37.73	-15%
Meadowbrook	5,244	89.47	89.47	0.00	0%
Sacramento	66,410	165.46	146.81	-18.65	-11%

Northern Div. Scenario 11

Average CAP Residential Bill by Usage Range

					%
0-5 CCF	Bills	Baseline	New	Difference	Difference
Fruitridge	446	30.11	30.11	0.00	0%
Larkfield	943	35.42	42.24	6.82	19%
Meadowbrook	116	19.79	19.79	0.00	0%
Sacramento	26,056	22.73	28.48	5.75	25%
6-10 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	391	36.86	36.86	0.00	0%
Larkfield	560	58.57	57.76	-0.82	-1%
Meadowbrook	191	31.05	31.05	0.00	0%
Sacramento	27,902	36.78	39.69	2.92	8%
11-15 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	256	43.84	43.84	0.00	0%
Larkfield	202	83.84	74.97	-8.87	-11%
Meadowbrook	207	38.38	38.38	0.00	0%
Sacramento	17,164	52.66	52.49	-0.17	0%
16-20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	179	51.26	51.26	0.00	0%
Larkfield	96	112.75	99.98	-12.77	-11%
Meadowbrook	139	47.39	47.39	0.00	0%
Sacramento	9,567	70.98	67.27	-3.71	-5%
>20 CCF	Bills	Baseline	New	Difference	% Difference
Fruitridge	209	69.39	69.39	0.00	0%
Larkfield	81	182.81	156.68	-26.12	-14%
Meadowbrook	306	85.96	85.96	0.00	0%
Sacramento	10,492	132.83	117.53	-15.30	-12%

ATTACHMENT 4



CALIFORNIA AMERICAN WATER AFFORDABILITY METRICS

2022 General Rate Case



Prepared by
M.Cubed
Oakland, CA

June 2022

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Introduction

This report presents affordability metrics for essential water service (EWS) for Cal Am districts. The report presents the results for the three affordability metrics required by D.20-07-032. These are:

- **Socioeconomic Vulnerability Index (SEVI)** – This metric describes the relative socioeconomic characteristics of each census tract overlaying a district. Five socioeconomic indicators are considered: educational attainment, linguistic isolation, poverty level, unemployment level, and housing cost burden. The SEVI metric does not directly assess the affordability of EWS. Instead, it is intended to illustrate the potential for disparate socioeconomic conditions within a utility's service territory in an easily understood form.¹
- **Hours at Minimum Wage (HM)** – This metric calculates the hours of work at minimum wage that would be needed to pay for EWS.
- **Affordability Ratio (AR)** – This metric quantifies the percentage of household income that is needed to pay for EWS, after non-discretionary costs for housing and other essential utility services are removed from household income. Following D.20-07-032 guidance, AR is calculated for the 20th and 50th percentiles of household income in each district.

The HM and AR metrics are based on EWS, which D.20-07-032 defines as 6 hundred cubic feet (CCF) of water per month. The metrics have been calculated using Cal Am's current rates and the rates it is proposing in this General Rate Case (GRC), inclusive of surcharges and surcredits. The metrics have been calculated with and without the Customer Assistance Program (CAP) discount.²

Essential Water Service Cost

D.20-07-032 sets EWS to 6 CCF per month. The monthly cost for EWS was computed for each district at current and proposed rates, including applicable surcharges and surcredits, assuming a standard 5/8 inch meter. Surcharges and surcredits included the following:

- Consolidated Expense Balancing Account (CEBA) surcharge
- Water Revenue Adjustment Mechanism (WRAM)/Modified Cost Balancing Account (MCBA) surcharge/surcredit
- Customer Assistance Program Surcharge (not applicable to CAP customers)
- Excess Accumulated Deferred Income Tax (ADIT) refund
- Pure Water Monterey Purchased Water Surcharge (only applicable to Monterey Main)
- Monterey Peninsula Water Management District User Fee (only applicable to Monterey Main)

¹ D.20-07-032, page 16.

² Per D.20-07-032 (page 47), the base metrics are to be computed without the incorporation of the CAP discount. However, the decision further states that "this does not mean that parties cannot use the effect of low-income subsidy programs when interpreting the outputs of the affordability metrics as they might be used in other Commission proceedings, or that the Commission itself will not consider the effect of these programs when evaluating the affordability metrics."

Monthly water cost for EWS was calculated with and without the CAP discount. Under Cal Am's current CAP program, Monterey Main CAP customers receive a 30% discount on the meter charge and on water use in the first three tiers of consumption. For Cal Am's other districts, CAP customers receive a 20% discount on the meter charge and on water use in the first two tiers of consumption. Under Cal Am's proposed CAP program, the CAP discount would increase from 30% to 35% in Monterey Main and from 20% to 25% in Cal Am's other districts. Non-CAP customers currently pay a \$1.30/meter surcharge to fund the CAP program. Under Cal Am's proposed rates, the CAP surcharge would increase by approximately 24% to \$1.61/meter.³

Table 1 summarizes the monthly cost for EWS by district under the current and proposed rates. Tables 2 and 3 provide the individual charges under the current and proposed rates, respectively, that comprise the monthly cost for EWS.

Table 1. Monthly Cost of EWS at Current and Proposed Rates by District

District	Without CAP Discount		With CAP Discount	
	Current	Proposed	Current	Proposed
Monterey	121.99	134.57	95.63	100.68
San Diego	58.56	68.28	46.62	51.02
Ventura	49.28	62.26	39.38	46.73
Baldwin Hills	48.18	59.94	38.94	45.54
Duarte	40.12	53.10	31.38	39.02
San Marino	38.80	51.78	30.06	37.70
Sacramento	38.70	48.32	29.45	34.44
Meadowbrook	32.42	39.99	25.05	28.97
Larkfield	60.28	64.25	47.57	47.46

³ Cal Am has not finalized its proposed CAP surcharge. For purposes of this affordability report, the current surcharge is scaled up by the average increase in the CAP subsidy proposed by Cal Am.

Table 2. Monthly Cost of EWS at Current Rates

District	EWS (CCF)	Meter Charge	Meter Surcharges/Surcredits	CAP Meter Charge Discount	Water Use in 1st Tier	Water Use in 2nd Tier	Rate in 1st Tier (\$/CCF)	Rate in 2nd Tier (\$/CCF)	Base Volume Charge	Volume Surcharges/Surcredits	CAP Volume Charge Discount	Monthly Cost of EWS Without CAP Discount	Monthly Cost of EWS With CAP Discount
Monterey	6	28.68	3.41	-9.90	4	2	7.84	11.75	54.85	35.05	-16.45	121.99	95.63
San Diego	6	16.52	1.23	-4.60	6	0	6.11	NA	36.69	4.12	-7.34	58.56	46.62
Ventura	6	16.52	1.17	-4.60	6	0	4.41	NA	26.48	5.10	-5.30	49.28	39.38
Baldwin Hills	6	16.52	1.09	-4.60	6	0	3.87	NA	23.19	7.38	-4.64	48.18	38.94
Duarte	6	16.52	1.09	-4.60	6	0	3.45	NA	20.69	1.82	-4.14	40.12	31.38
San Marino	6	16.52	1.09	-4.60	6	0	3.45	NA	20.69	0.50	-4.14	38.80	30.06
Sacramento	6	19.16	-2.00	-5.13	6	0	3.43	NA	20.60	0.94	-4.12	38.70	29.45
Meadowbrook	6	19.77	1.10	-5.25	4.5	1.5	1.75	1.84	10.62	0.94	-2.12	32.42	25.05
Larkfield	6	17.99	0.89	-4.90	5	1	6.47	6.74	39.07	2.34	-7.81	60.28	47.57
Notes: CAP Meter Charge Discount includes refund of CAP surcharge which is included in the Meter Surcharges/Surcredits. Only non-CAP customers pay the CAP surcharge.													

Table 3. Monthly Cost of EWS at Proposed Rates

District	EWS (CCF)	Meter Charge	Meter Surcharges/Surcredits	CAP Meter Charge Discount	Water Use in 1st Tier	Water Use in 2nd Tier	Rate in 1st Tier (\$/CCF)	Rate in 2nd Tier (\$/CCF)	Base Volume Charge	Volume Surcharges/Surcredits	CAP Volume Charge Discount	Monthly Cost of EWS Without CAP Discount	Monthly Cost of EWS With CAP Discount
Monterey	6	45.78	5.14	-17.63	4	2	5.81	11.62	48.98	46.47	-16.26	134.57	100.68
San Diego	6	22.96	1.54	-7.35	6	0	6.61	7.71	38.20	39.66	-9.91	68.28	51.02
Ventura	6	22.96	1.48	-7.35	6	0	5.45	6.36	28.72	32.72	-8.18	62.26	46.73
Baldwin Hills	6	22.96	1.40	-7.35	6	0	4.70	5.48	25.94	28.20	-7.05	59.94	45.54
Duarte	6	22.96	1.40	-7.35	6	0	4.49	5.23	22.54	26.92	-6.73	53.10	39.02
San Marino	6	22.96	1.40	-7.35	6	0	4.49	5.23	22.54	26.92	-6.73	51.78	37.70
Sacramento	6	30.64	-1.69	-9.27	6	0	3.07	4.68	19.17	18.43	-4.61	48.32	34.44
Meadowbrook	6	27.71	1.41	-8.54	4.5	1.5	1.53	2.04	9.90	9.93	-2.48	39.99	28.97
Larkfield	6	23.49	1.20	-7.48	5	1	6.16	6.42	36.34	37.22	-9.31	64.25	47.46
Notes: CAP Meter Charge Discount includes refund of CAP surcharge which is included in the Meter Surcharges/Surcredits. Only non-CAP customers pay the CAP surcharge.													

Socioeconomic Vulnerability Index

The SEVI metric uses publicly available data from the California Office of Environmental Health Hazard Assessment (OEHHA).⁴ SEVI is comprised of five indicators intended to measure the socioeconomic vulnerability of a given census tract in the state. These are: educational attainment, linguistic isolation, poverty level, unemployment level, and housing cost burden. Each indicator's raw score is converted to a percentile score that ranges from 0 to 100. For example, if a census tract's unemployment percentile score is 75 it means that 75% of the census tracts in the state have a lower and 25% have a higher unemployment score than that particular census tract. A tract's SEVI score is calculated by averaging its percentile scores of the five indicators. Since the percentile scores range from 0 to 100, the SEVI score also ranges from 0 to 100, where 0 is considered the least socioeconomically vulnerable and 100 the most.

Maps showing the distribution of SEVI scores within each district are provided in Figures 1 through 9. The weighted average SEVI score for each district is provided in Table 4. The area of each census tract within the district are the weights used to form each district's average SEVI score. The statewide average SEVI score is also provided in Table 4 for reference. The district average SEVI score is lower than the statewide average SEVI score for seven Cal Am districts and higher for two Cal Am districts. The raw data used to calculate the SEVI scores for each district are provided in Attachment 1.

Table 4. District Weighted Average SEVI Score

District	Number of Census Tracts with Scores in District	Average SEVI Score for District
Monterey Main	34	25.2
Larkfield	5	30.9
Sacramento	93	44.0
Meadowbrook	7	65.0
Ventura	24	23.9
Baldwin Hills	12	38.9
San Marino	34	43.1
Duarte	12	46.5
San Diego	36	50.7
Statewide Average	7,444	49.8
Notes: Only census tracts with scores for all five indicators included in calculation of average SEVI Score. The statewide average is weighted by census tract populations.		

⁴ <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>

Figure 1. Monterey Main SEVI Score Distribution

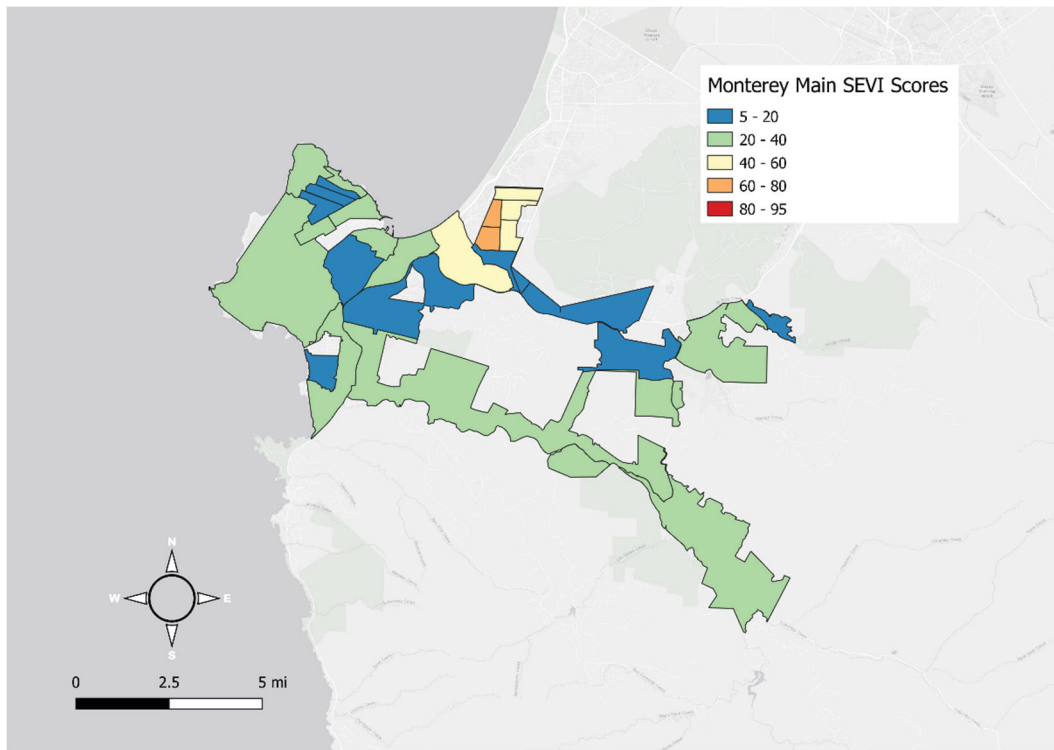


Figure 2. Larkfield SEVI Score Distribution

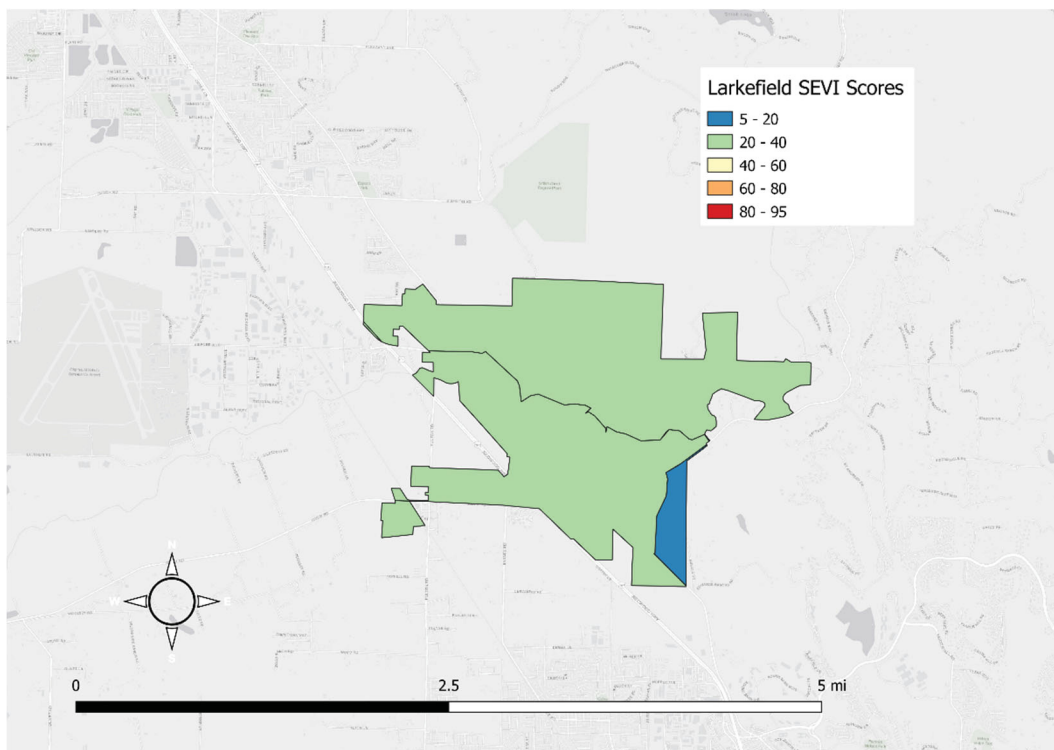


Figure 3. Sacramento SEVI Score Distribution

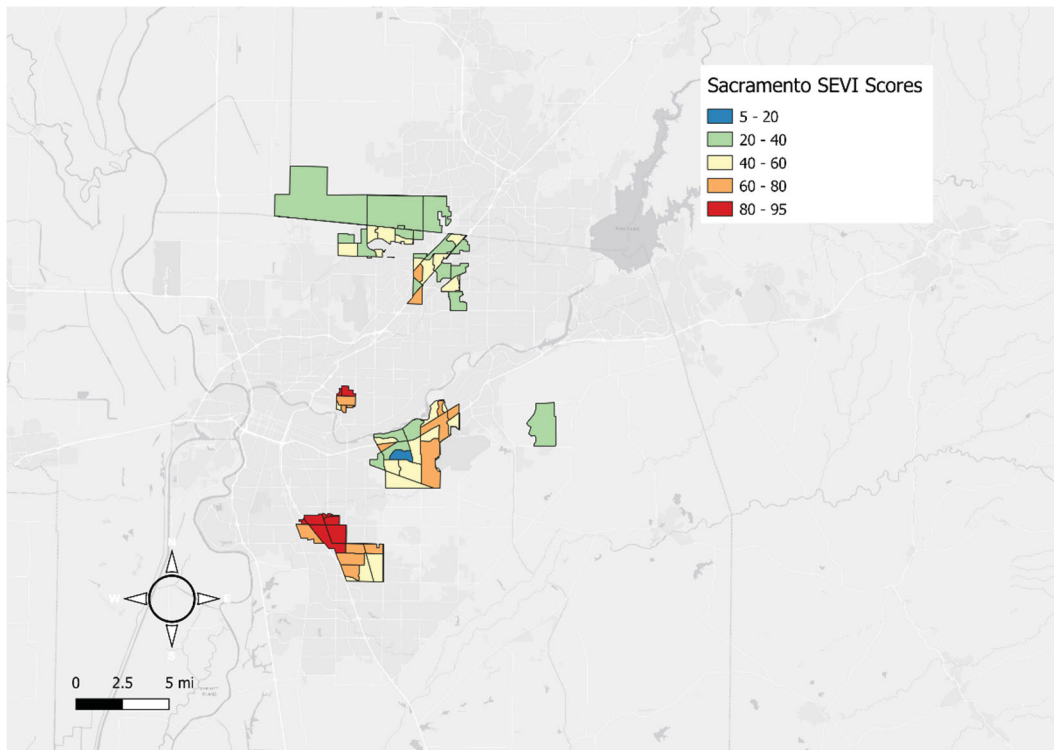


Figure 4. Meadowbrook SEVI Score Distribution

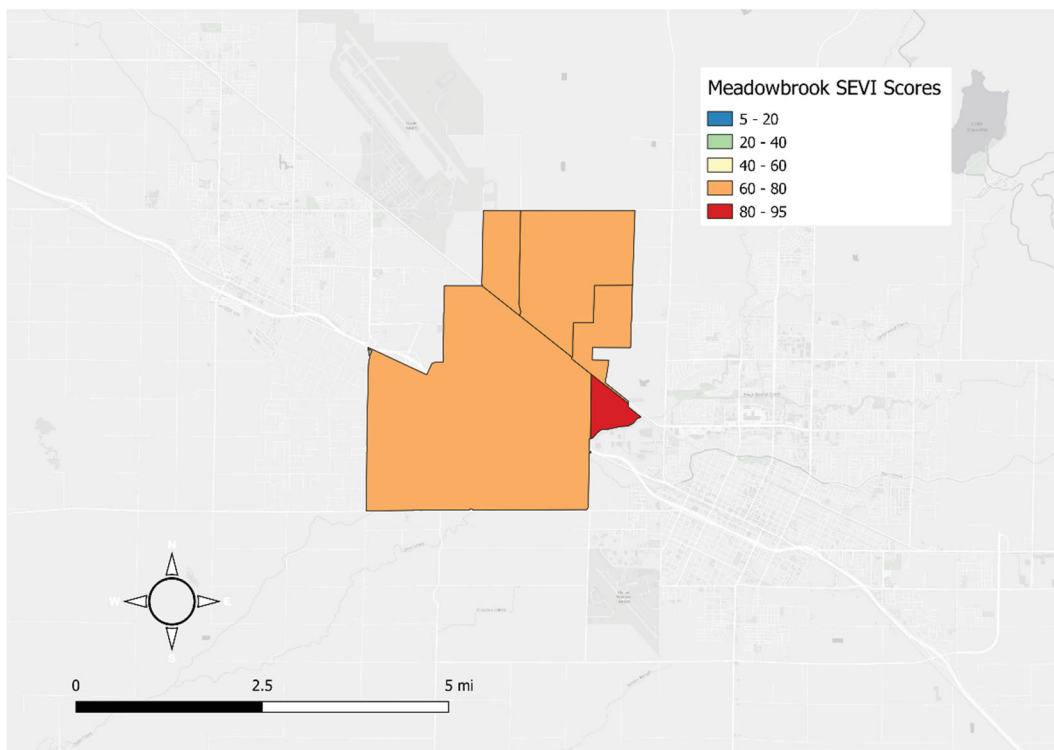


Figure 5. Ventura SEVI Score Distribution

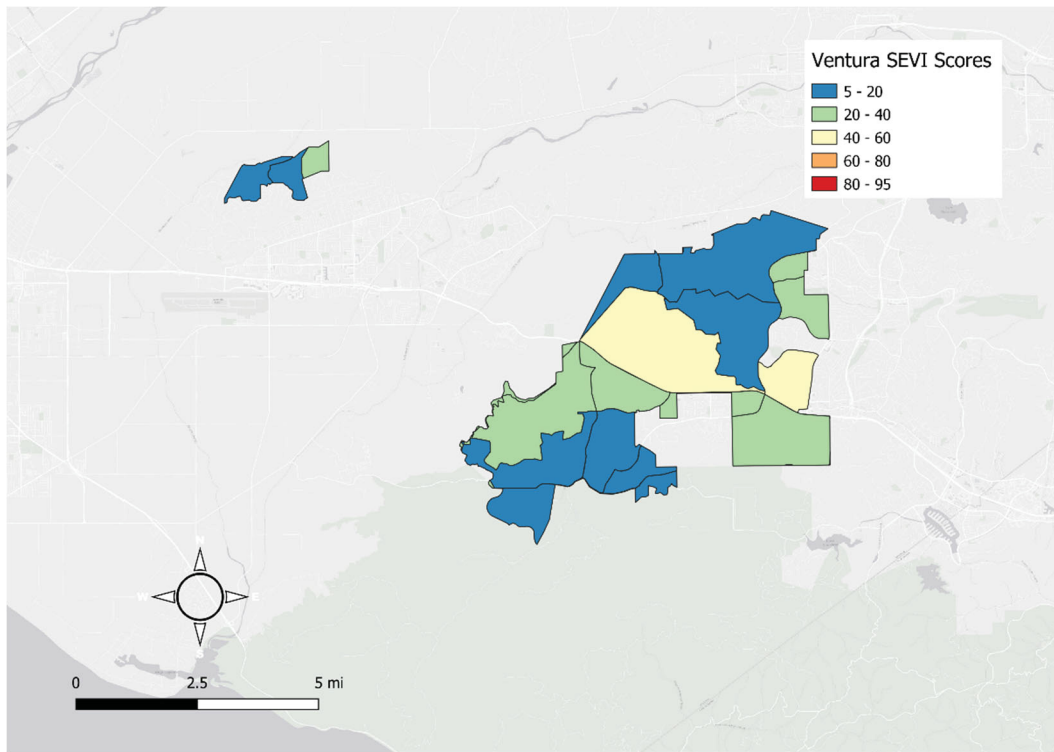


Figure 6. Baldwin Hills SEVI Score Distribution

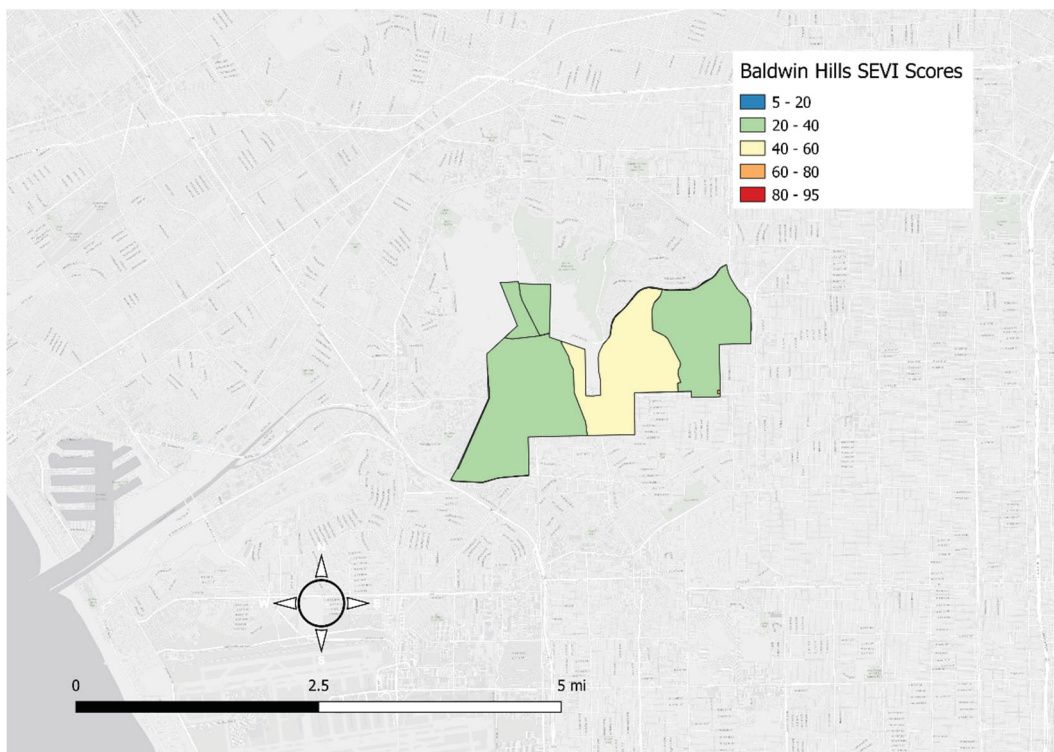


Figure 7. San Marino SEVI Score Distribution

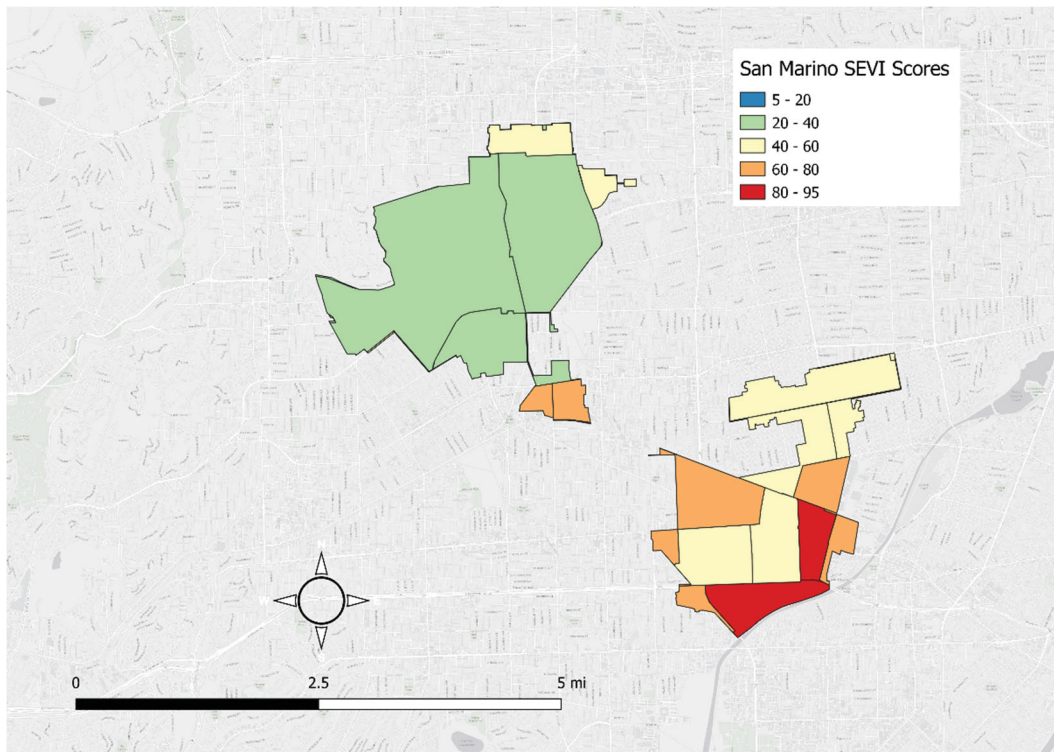


Figure 8. Duarte SEVI Score Distribution

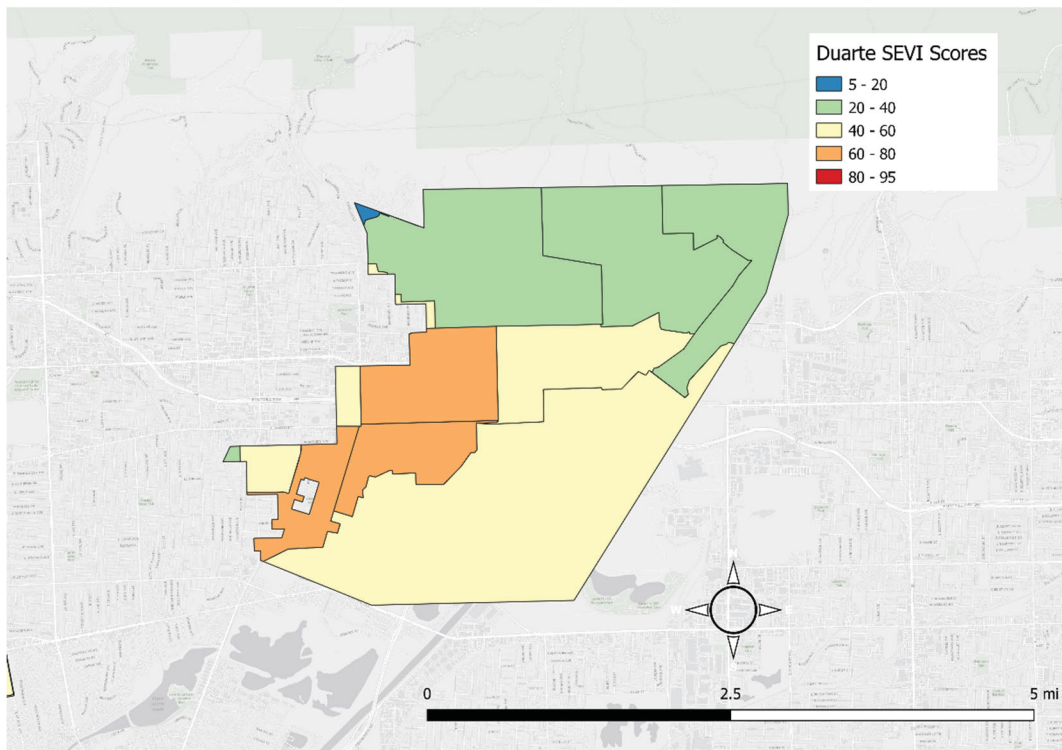
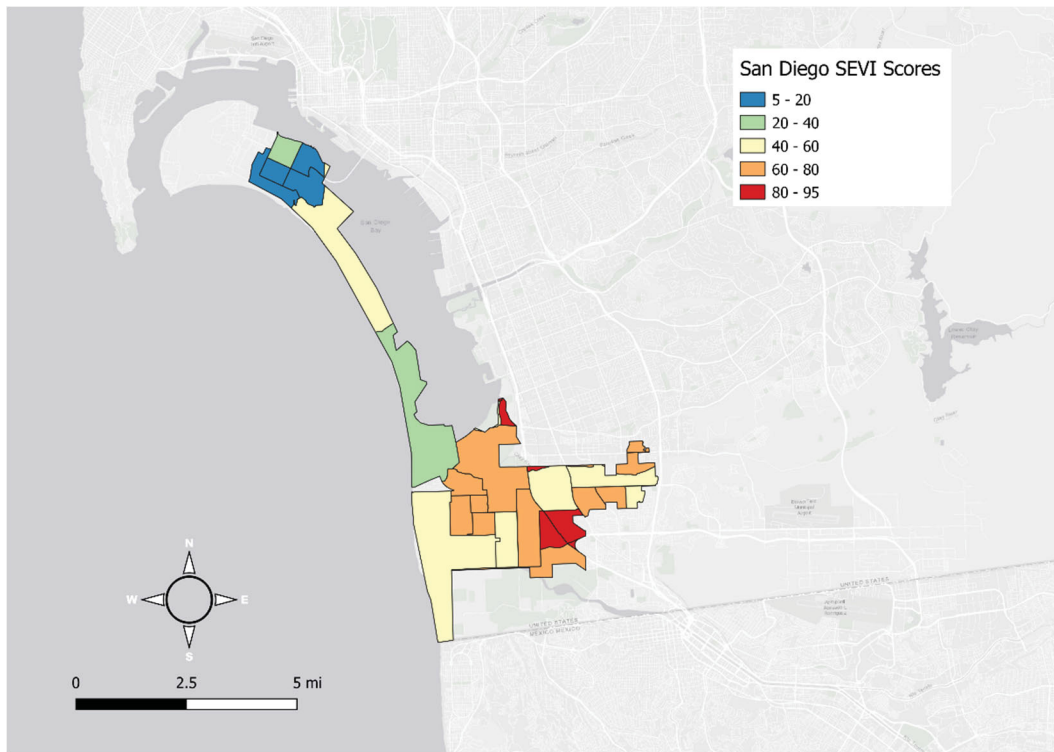


Figure 9. San Diego SEVI Score Distribution



Hours at Minimum Wage

The HR metric is simply the hours at minimum wage required to pay the monthly cost for EWS. This is shown for current rates in Table 5 and for proposed rates in Table 6. The minimum wage expected to be effective January 1, 2023, was used to calculate the HR metric.

Table 5. HR Metric by District at Current Rates

District	Minimum Wage Effective 1/1/2023 (\$/hr)	Monthly EWS Cost at Current Rates		HR Metric at Current Rates	
		Without CAP Discount	With CAP Discount	Without CAP Discount	With CAP Discount
Monterey	15.00	121.99	95.63	8.1	6.4
San Diego	15.00	58.56	46.62	3.9	3.1
Ventura	15.00	49.28	39.38	3.3	2.6
Baldwin Hills	15.00	48.18	38.94	3.2	2.6
Duarte	15.00	40.12	31.38	2.7	2.1
San Marino	15.00	38.80	30.06	2.6	2.0
Sacramento	15.00	38.70	29.45	2.6	2.0
Meadowbrook	15.00	32.42	25.05	2.2	1.7
Larkfield	15.00	60.28	47.57	4.0	3.2

Table 6. HR Metric by District at Proposed Rates

District	Minimum Wage Effective 1/1/2023 (\$/hr)	Monthly EWS Cost at Proposed Rates		HR Metric at Proposed Rates	
		Without CAP Discount	With CAP Discount	Without CAP Discount	With CAP Discount
Monterey	15.00	134.57	100.68	9.0	6.7
San Diego	15.00	68.28	51.02	4.6	3.4
Ventura	15.00	62.26	46.73	4.2	3.1
Baldwin Hills	15.00	59.94	45.54	4.0	3.0
Duarte	15.00	53.10	39.02	3.5	2.6
San Marino	15.00	51.78	37.70	3.5	2.5
Sacramento	15.00	48.32	34.44	3.2	2.3
Meadowbrook	15.00	39.99	28.97	2.7	1.9
Larkfield	15.00	64.25	47.46	4.3	3.2

Affordability Ratio

The AR metric divides the cost for EWS by household income net of non-discretionary housing costs. Non-discretionary housing costs include mortgage and rent costs, condominium fees, property taxes, property insurance, and costs for utility services other than water. Per D.20-07-032, income and housing costs were calculated using census Public Use Microdata Sample (PUMS) data from Public Use Microdata Areas (PUMAs) that overlay each Cal Am district service area. There are 265 PUMAs in California. The list of PUMAs overlaying Cal Am districts is provided in Attachment 2.

Using the PUMS data, the 20th and 50th percentiles of monthly household income were computed for each service area. These income levels are shown in Table 7.

Table 7. 20th and 50th Percentile Monthly Household Income by District

District	Mean Household Size (Persons per Household)	Monthly Household Income	
		20th Percentile	50th Percentile
Monterey	2.23	3,100	6,967
San Diego	2.21	2,917	6,667
Ventura	2.55	3,625	8,417
Baldwin Hills	1.90	3,058	8,333
Duarte	3.20	2,542	5,667
San Marino	2.91	2,250	5,433
Sacramento	2.62	2,242	5,300
Meadowbrook	2.80	2,675	6,750
Larkfield	2.03	3,042	7,250
Note: Monthly household income is calculated by dividing by 12 the annual income reported in the PUMS data.			

Per D.20-07-032, PUMS data were used to estimate the following regression model for each district relating non-discretionary housing cost to household income and household size (persons per household):⁵

$$Housing\ Cost_i = a + b \cdot \sqrt{Household\ Income_i} + c \cdot Household\ Size_i + u_i$$

Regression output for each district is provided in Attachment 3. The estimated model coefficients (a, b, and c) were then used with the mean household size and household income levels in Table 7 to estimate average housing cost for the 20th and 50th income levels. Estimated housing costs were then subtracted from household income to arrive at household income net of non-discretionary housing costs. The results are shown in Table 8.

⁵ Also, per D.20-07-032, if a household's income exceeded five times the mean household income for the district, it was flagged as an outlier and excluded from the regression.

Affordability ratios at the 20th and 50th percentiles of net monthly household income were then computed by dividing the cost for monthly EWS in Table 1 by the net monthly household income in Table 8. The results under current and proposed rates are provided in Tables 9 and 10, respectively.

Table 8. 20th and 50th Percentile Monthly Net Household Income by District

District	Monthly Household Income		Estimated Monthly Housing Cost		Estimated Net Monthly Household Income	
	20th Percentile	50th Percentile	20th Percentile	50th Percentile	20th Percentile	50th Percentile
Monterey	3,100	6,967	1,493	1,884	1,607	5,083
San Diego	2,917	6,667	1,502	1,913	1,414	4,754
Ventura	3,625	8,417	1,702	2,134	1,923	6,283
Baldwin Hills	3,058	8,333	1,965	2,417	1,093	5,917
Duarte	2,542	5,667	1,195	1,475	1,347	4,191
San Marino	2,250	5,433	1,286	1,576	964	3,857
Sacramento	2,242	5,300	1,068	1,334	1,174	3,966
Meadowbrook	2,675	6,750	829	1,012	988	3,155
Larkfield	3,042	7,250	1,373	1,781	1,669	5,469

Table 9. AR₂₀ and AR₅₀ Metrics at Current Rates by District

District	AR at Current Rates Without CAP Discount		AR at Current Rates With CAP Discount	
	AR ₂₀	AR ₅₀	AR ₂₀	AR ₅₀
Monterey	7.6%	2.4%	6.0%	1.9%
San Diego	4.1%	1.2%	3.3%	1.0%
Ventura	2.6%	0.8%	2.0%	0.6%
Baldwin Hills	4.4%	0.8%	3.6%	0.7%
Duarte	3.0%	1.0%	2.3%	0.7%
San Marino	4.0%	1.0%	3.1%	0.8%
Sacramento	3.3%	1.0%	2.5%	0.7%
Meadowbrook	3.3%	1.0%	2.5%	0.8%
Larkfield	3.6%	1.1%	2.9%	0.9%

Table 10. AR₂₀ and AR₅₀ Metrics at Proposed Rates by District

District	AR at Proposed Rates Without CAP Discount		AR at Proposed Rates With CAP Discount	
	AR ₂₀	AR ₅₀	AR ₂₀	AR ₅₀
Monterey	8.4%	2.6%	6.3%	2.0%
San Diego	4.8%	1.4%	3.6%	1.1%
Ventura	3.2%	1.0%	2.4%	0.7%
Baldwin Hills	5.5%	1.0%	4.2%	0.8%
Duarte	3.9%	1.3%	2.9%	0.9%
San Marino	5.4%	1.3%	3.9%	1.0%
Sacramento	4.1%	1.2%	2.9%	0.9%
Meadowbrook	4.0%	1.3%	2.9%	0.9%
Larkfield	3.9%	1.2%	2.8%	0.9%

Attachment 1: Raw Data used to Compute SEVI Scores

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Baldwin Hills		6037703001	308,231	3.9	6.3	4.9	49.9	40.9	21.2
Baldwin Hills		6037236000	314,883	35.2	0.0	26.2	45.8	53.1	32.1
Baldwin Hills		6037236400	21,423	14.2	0.9	37.9	70.9	67.7	38.3
Baldwin Hills		6037703002	3,176,932	10.3	8.5	16.0	84.6	74.5	38.8
Baldwin Hills		6037703200	2,095,454	20.3	8.5	30.9	89.9	49.0	39.7
Baldwin Hills		6037276100	7,839	8.4	34.6	32.0	51.3	77.8	40.8
Baldwin Hills		6037703100	2,385,347	15.8	0.0	25.7	90.9	74.0	41.3
Baldwin Hills		6037235100	2,249	44.9	13.3	30.5	94.7	83.1	53.3
Baldwin Hills		6037234501	245	74.2	4.6	54.5	51.3	99.7	56.9
Baldwin Hills		6037234600	2,318	65.7	44.4	49.3	76.1	97.5	66.6
Baldwin Hills		6037236100	2,817	61.7	56.3	82.4	94.3	98.4	78.6
Baldwin Hills		6037234502	84	70.6	59.4	80.9	98.7	97.1	81.3
Duarte		6037430301	45,818	21.4	26.4	5.8	23.8	5.5	16.6
Duarte		6037430200	4,162,532	30.9	60.6	24.2	7.1	20.6	28.7
Duarte		6037430003	3,280,542	21.4	33.9	9.0	79.7	4.5	29.7
Duarte		6037431300	36,775	32.2	40.9	24.4	36.4	29.2	32.6
Duarte		6037400603	2,204,995	40.5	37.0	37.2	44.4	17.9	35.4
Duarte		6037404600	9,256,352	69.8	36.5	48.7	73.4	35.3	52.7
Duarte		6037431100	681,681	57.6	62.2	57.3	59.4	29.7	53.3
Duarte		6037430002	2,150,496	53.1	68.2	37.6	72.5	49.7	56.2
Duarte		6037431002	83,970	25.9	40.9	56.1	81.7	86.0	58.1
Duarte		6037430101	1,934,750	60.5	76.6	63.3	45.8	66.1	62.5
Duarte		6037430102	1,294,281	80.5	77.6	51.9	51.3	54.6	63.2
Duarte		6037431200	1,023,082	78.6	69.2	53.5	67.5	53.1	64.4
Larkfield		6097152801	393,967	53.9	-999.0	37.2	-999.0	32.3	-999.0
Larkfield		6097152400	322,219	14.2	17.3	1.7	43.1	7.1	16.7

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Larkfield		6097152702	3,354,743	49.4	1.8	39.6	7.1	36.2	26.8
Larkfield		6097152906	137,211	38.5	37.7	15.8	5.6	38.1	27.1
Larkfield		6097152701	4,169,821	43.4	20.6	48.0	14.4	50.3	35.3
Meadowbrook		6047000702	6,465	55.5	38.6	12.4	43.1	7.7	31.5
Meadowbrook		6047001501	300	64.7	48.7	61.3	11.9	68.5	51.0
Meadowbrook		6047002500	5,593,086	76.8	64.8	66.1	79.7	17.9	61.1
Meadowbrook		6047001002	1,679,248	64.5	30.7	83.2	91.8	36.2	61.3
Meadowbrook		6047000902	18,297,393	73.8	61.1	68.8	86.2	38.1	65.6
Meadowbrook		6047000503	1,561,379	82.9	80.2	66.3	71.7	34.2	67.1
Meadowbrook		6047001005	768,135	80.2	65.6	92.4	97.3	75.3	82.2
Monterey		6053011801	1,045,945	0.0	0.0	18.2	-999.0	7.4	-999.0
Monterey		6053011604	10,041,850	16.8	0.0	28.9	-999.0	59.7	-999.0
Monterey		6053011502	1,587,442	51.7	-999.0	43.5	-999.0	25.7	-999.0
Monterey		6053013100	1,242,660	0.6	-999.0	6.5	37.7	73.4	-999.0
Monterey		6053014000	2,177,084	73.6	-999.0	75.4	61.5	67.7	-999.0
Monterey		6053012600	1,652,384	0.8	-999.0	28.9	-999.0	-999.0	-999.0
Monterey		6053010701	1,157,908	3.1	9.5	3.5	15.8	0.1	6.4
Monterey		6053013200	20,199,986	18.4	6.3	3.1	21.1	1.1	10.0
Monterey		6053011802	1,660,607	12.6	0.0	9.3	0.0	46.5	13.7
Monterey		6053012800	4,330,202	17.8	3.7	21.5	11.9	16.3	14.2
Monterey		6053012200	851,473	2.7	19.9	4.0	29.4	19.4	15.1
Monterey		6053012100	1,158,435	10.3	14.3	9.0	56.2	6.3	19.2
Monterey		6053013400	1,253,295	9.0	5.6	17.9	45.8	17.9	19.2
Monterey		6053012302	567,924	10.8	7.4	24.4	1.9	52.1	19.3
Monterey		6053012000	1,078,423	28.1	28.0	36.8	7.1	0.9	20.2
Monterey		6053010702	9,173,365	24.1	25.6	16.8	32.3	5.0	20.8
Monterey		6053011900	19,423,303	8.4	30.7	18.4	49.9	6.3	22.7
Monterey		6053011700	5,215,857	17.2	14.3	8.1	52.5	25.7	23.6
Monterey		6053012401	733,900	6.9	30.7	22.9	21.1	44.5	25.2

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Monterey		6053011602	25,172,842	20.3	18.1	23.9	47.0	31.2	28.1
Monterey		6053012502	1,598,041	22.2	26.4	36.8	2.7	60.1	29.7
Monterey		6053011000	17,772,248	30.9	18.9	34.9	55.0	14.2	30.8
Monterey		6053012402	2,767,692	9.3	5.6	22.7	74.7	50.3	32.5
Monterey		6053012700	1,576,066	24.1	24.8	26.7	37.7	64.0	35.4
Monterey		6053013000	3,286,703	28.8	14.3	25.3	37.7	76.9	36.6
Monterey		6053014107	118,689	30.4	5.6	46.2	44.4	69.2	39.1
Monterey		6053010501	76,101	54.6	54.6	40.3	28.2	31.2	41.8
Monterey		6053013500	1,041,122	43.8	45.4	59.5	7.1	62.4	43.6
Monterey		6053013300	5,655,359	59.1	50.5	59.2	21.1	31.2	44.2
Monterey		6053014800	331,061	91.9	68.2	69.6	8.7	18.9	51.4
Monterey		6053013800	875,872	72.9	46.0	44.6	70.9	31.7	53.2
Monterey		6053013900	1,023,958	63.9	49.6	52.7	22.6	92.7	56.3
Monterey		6053013600	949,127	76.4	70.9	76.2	49.9	80.1	70.7
Monterey		6053013700	707,836	82.2	81.6	78.3	17.1	94.5	70.7
Sacramento		6067008131	989,776	29.3	26.4	63.5	-999.0	49.0	-999.0
Sacramento		6067007427	1,343,068	30.4	-999.0	49.1	32.3	57.4	-999.0
Sacramento		6067005804	13,785	12.0	11.3	6.5	5.6	6.6	8.4
Sacramento		6067009108	1,501,058	19.3	22.9	37.6	3.6	10.2	18.7
Sacramento		6061021035	13,898	14.8	11.3	15.3	53.9	16.3	22.3
Sacramento		6061021322	25,700,729	26.9	27.3	30.9	22.6	10.8	23.7
Sacramento		6067007421	1,110,894	25.1	32.6	41.2	1.3	23.8	24.8
Sacramento		6067007904	27,270	38.9	18.1	27.0	45.8	3.4	26.6
Sacramento		6067008111	1,265,391	36.6	2.8	38.6	40.6	19.4	27.6
Sacramento		6067008705	7,332,782	4.7	36.5	8.4	75.4	14.2	27.8
Sacramento		6067007417	2,018,094	55.3	17.3	39.6	17.1	14.7	28.8
Sacramento		6067009109	1,758,308	19.8	21.4	36.4	40.6	27.8	29.2
Sacramento		6067005204	1,148,193	20.9	21.4	43.5	40.6	22.7	29.8
Sacramento		6067008119	1,929,377	31.7	11.3	49.3	47.0	12.0	30.3

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Sacramento		6067007432	1,114,928	31.4	26.4	46.2	19.6	28.2	30.4
Sacramento		6067007415	648,757	36.6	4.6	55.5	30.9	34.8	32.5
Sacramento		6061020908	5,868,209	30.9	30.7	51.9	17.1	32.7	32.7
Sacramento		6067009106	1,620,406	30.4	16.4	43.3	28.2	45.0	32.7
Sacramento		6067007903	336	23.3	2.8	39.4	58.4	41.4	33.0
Sacramento		6061022500	13,526,924	32.9	19.9	41.9	70.9	0.9	33.3
Sacramento		6067008113	1,141,001	37.6	33.3	47.1	29.4	22.1	33.9
Sacramento		6061021038	2,979	19.3	3.7	39.2	76.7	36.7	35.1
Sacramento		6061020805	4,765	30.0	5.6	43.7	33.6	63.6	35.3
Sacramento		6067008117	6,262	39.5	36.5	48.0	23.8	33.7	36.3
Sacramento		6067008127	1,973,501	33.9	28.0	41.9	45.8	33.2	36.6
Sacramento		6067008132	1,639,501	52.5	23.8	48.2	32.3	30.2	37.4
Sacramento		6067009107	2,156,633	16.2	17.3	56.4	76.1	21.1	37.4
Sacramento		6067007206	1,172,971	42.3	28.8	47.3	41.8	32.3	38.5
Sacramento		6067007431	1,141,315	16.8	42.8	46.4	43.1	51.8	40.2
Sacramento		6067007430	1,785,334	22.2	46.0	39.4	32.3	69.2	41.8
Sacramento		6101051100	20	54.6	39.2	50.7	56.2	8.5	41.8
Sacramento		6067007428	557,331	26.4	21.4	53.6	81.0	32.3	42.9
Sacramento		6067008129	1,076,668	40.8	22.9	41.5	83.2	26.7	43.0
Sacramento		6067008801	195,177	28.8	46.5	27.3	79.0	33.7	43.1
Sacramento		6067009103	1,897,943	40.1	40.4	42.6	56.2	36.2	43.1
Sacramento		6067008130	1,704,785	40.1	50.5	46.4	67.5	12.0	43.3
Sacramento		6067009111	1,469,122	50.2	57.8	57.0	10.7	41.9	43.5
Sacramento		6067009322	311,333	59.8	42.8	36.8	56.2	24.5	44.0
Sacramento		6067008136	191,981	7.8	42.8	55.2	57.2	59.7	44.6
Sacramento		6067008905	831	32.9	35.3	54.8	48.3	54.1	45.1
Sacramento		6067008128	1,004,225	45.2	18.1	59.7	70.0	37.5	46.1
Sacramento		6067008910	282,926	45.2	30.0	74.5	51.3	30.2	46.2
Sacramento		6067005202	2,840	15.8	13.3	48.2	90.3	66.5	46.8

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Sacramento		6067009311	109,781	43.4	48.2	57.8	64.5	26.7	48.1
Sacramento		6067009317	2,707,399	54.8	32.0	42.9	77.8	33.2	48.1
Sacramento		6067007433	776,175	38.9	79.8	48.4	19.6	56.0	48.5
Sacramento		6067005402	220,521	17.2	47.1	80.8	10.7	88.5	48.8
Sacramento		6067009112	2,985,794	32.6	43.3	63.5	36.4	70.5	49.3
Sacramento		6067009004	1,377,224	52.5	54.6	55.9	45.8	38.1	49.4
Sacramento		6067007207	1,843,721	40.5	40.9	64.4	32.3	69.5	49.5
Sacramento		6067008135	1,359,093	42.3	40.4	57.3	33.6	77.2	50.2
Sacramento		6067009312	89,087	51.7	58.2	48.4	40.6	53.6	50.5
Sacramento		6067007406	58,517	62.0	46.0	88.5	21.1	46.5	52.8
Sacramento		6067008909	1,258,203	39.5	38.1	66.3	83.6	39.7	53.5
Sacramento		6067009010	50,208	28.4	54.6	71.9	87.1	27.8	54.0
Sacramento		6067009105	876,421	44.6	30.7	85.2	76.7	34.2	54.3
Sacramento		6067009201	3,140,348	47.5	43.9	58.5	62.4	61.9	54.8
Sacramento		6067009800	1,338,738	53.4	20.6	66.3	73.4	64.8	55.7
Sacramento		6067009007	986,632	65.5	57.4	84.9	14.4	57.4	55.9
Sacramento		6067008134	16,029	44.6	41.4	54.6	89.5	49.7	56.0
Sacramento		6067007426	399,214	28.4	35.3	74.5	80.4	66.5	57.0
Sacramento		6067009321	1,778,635	63.8	68.7	51.1	65.6	36.2	57.1
Sacramento		6067009900	811,916	70.8	69.2	73.5	51.3	23.4	57.6
Sacramento		6067005205	673	51.0	13.3	77.2	81.0	71.6	58.8
Sacramento		6067005509	230,948	32.9	17.3	92.6	74.1	93.1	62.0
Sacramento		6061020901	1,780	56.2	28.8	84.2	69.1	74.8	62.6
Sacramento		6067007501	1,103,591	44.9	58.6	78.5	59.4	79.6	64.2
Sacramento		6067009005	6,030,676	56.2	56.9	83.9	94.1	31.7	64.5
Sacramento		6067007422	913,927	54.4	47.1	82.8	75.4	64.5	64.8
Sacramento		6067005601	45	44.0	27.3	75.1	95.6	83.1	65.0
Sacramento		6067004904	1,924,761	54.2	46.0	80.6	89.2	56.9	65.4
Sacramento		6067008911	544,917	56.0	62.2	89.5	56.2	80.7	68.9

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
Sacramento		6067005510	131,822	37.6	38.6	89.5	94.9	89.7	70.1
Sacramento		6067009314	14	51.5	65.2	65.9	98.1	72.6	70.7
Sacramento		6067005102	41,680	68.6	71.4	71.4	93.7	49.7	71.0
Sacramento		6067009316	1,218,265	63.6	77.1	67.7	95.6	57.9	72.4
Sacramento		6067009318	1,332,818	73.2	85.7	80.9	72.5	50.3	72.5
Sacramento		6067009006	2,911,702	70.6	61.9	86.9	77.8	68.5	73.1
Sacramento		6067009319	2,276,654	77.6	80.8	67.4	85.8	57.4	73.8
Sacramento		6067009008	795,706	67.4	71.4	84.1	87.4	66.1	75.3
Sacramento		6067009320	1,577,129	57.9	80.0	83.5	88.4	69.5	75.9
Sacramento		6067005506	1,246,942	67.4	46.5	91.1	85.8	94.4	77.1
Sacramento		6067009110	602,318	60.0	47.1	96.5	97.3	85.5	77.3
Sacramento		6067005502	161,899	62.9	73.7	95.1	92.6	86.8	82.2
Sacramento		6067005505	770,073	76.0	67.2	85.3	95.1	87.5	82.2
Sacramento		6067004802	950,068	75.7	77.4	89.5	95.3	77.6	83.1
Sacramento		6067005001	2,351,619	78.1	87.4	82.8	96.3	72.6	83.5
Sacramento		6067005002	2,842,688	75.6	85.1	97.5	94.7	71.9	84.9
Sacramento		6067004801	261,771	83.9	86.8	84.2	83.6	91.2	85.9
Sacramento		6067004702	28,109	81.3	81.6	96.1	94.3	82.6	87.2
Sacramento		6067004502	221,149	82.2	80.4	95.3	98.7	85.5	88.4
Sacramento		6067005101	120,961	76.4	87.4	92.1	97.7	94.6	89.6
Sacramento		6067004701	1,292,659	87.3	93.9	87.8	81.7	99.3	90.0
San Diego		6073011300	179,565	0.6	-999.0	47.1	-999.0	-999.0	-999.0
San Diego		6073010501	460,648	50.5	-999.0	43.1	93.5	74.8	-999.0
San Diego		6073009902	766,158	-999.0	-999.0	-999.0	-999.0	-999.0	-999.0
San Diego		6073021800	1,180,767	6.9	0.0	5.8	2.3	7.7	4.5
San Diego		6073010900	1,350,501	9.0	1.8	19.4	17.1	16.3	12.7
San Diego		6073010800	661,752	0.4	0.0	30.8	25.2	23.4	16.0
San Diego		6073011000	889,844	10.8	17.3	10.4	29.4	21.6	17.9
San Diego		6073010601	5,867,037	5.5	14.3	13.0	53.9	71.2	31.6

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
San Diego		6073011100	907,812	16.2	24.8	17.2	55.0	56.9	34.0
San Diego		6073010200	7,672,078	24.6	22.9	67.9	33.6	58.8	41.5
San Diego		6073021600	5,124,948	1.8	11.3	33.5	79.7	95.1	44.3
San Diego		6073010001	1,862,275	76.9	60.2	27.9	77.8	32.7	55.1
San Diego		6073010107	2,290,221	82.7	78.7	51.2	62.4	16.9	58.4
San Diego		6073010104	1,620,403	62.9	43.3	67.9	58.4	63.3	59.1
San Diego		6073021900	80,330	46.2	74.4	68.0	43.1	66.5	59.7
San Diego		6073010003	470,626	70.2	57.4	42.1	85.0	45.0	60.0
San Diego		6073010011	640,962	63.2	68.2	65.4	85.8	23.4	61.2
San Diego		6073010109	1,429,680	69.2	69.5	49.5	89.2	28.7	61.2
San Diego		6073010300	1,115,179	42.7	54.2	61.3	91.6	59.3	61.8
San Diego		6073010502	1,052,725	63.6	43.3	74.3	79.7	74.8	67.1
San Diego		6073013306	18,601	73.4	41.4	53.9	95.0	80.5	68.8
San Diego		6073013307	229,863	80.0	39.2	53.6	97.7	76.3	69.4
San Diego		6073010103	4,922,915	82.9	79.2	61.5	79.0	46.5	69.8
San Diego		6073010004	148	73.8	62.7	71.2	94.3	61.9	72.8
San Diego		6073010110	2,191,272	70.1	81.0	78.2	93.8	45.0	73.6
San Diego		6073013308	636,215	65.9	74.4	72.4	96.3	62.4	74.3
San Diego		6073010401	396,983	68.6	48.2	81.8	85.5	90.0	74.8
San Diego		6073010010	850,277	81.2	75.5	81.6	61.5	79.1	75.8
San Diego		6073010402	674,543	78.1	71.9	81.6	85.0	65.6	76.4
San Diego		6073013206	49,469	88.4	80.7	71.1	97.7	56.5	78.9
San Diego		6073013103	288,451	83.8	83.8	77.1	98.0	73.0	83.1
San Diego		6073010111	49,371	85.8	89.0	86.1	85.5	76.9	84.7
San Diego		6073012600	10,132	88.8	86.3	79.5	97.1	73.7	85.1
San Diego		6073010106	1,048,806	89.8	92.6	87.2	96.1	61.5	85.5
San Diego		6073010112	801,960	80.8	81.2	88.4	97.0	88.9	87.2
San Diego		6073013205	88,539	85.3	82.8	86.1	99.4	94.6	89.6
San Marino		6037432201	572,550	70.2	92.7	61.5	-999.0	52.1	-999.0

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
San Marino		6037480500	4,123	3.1	22.9	21.5	0.1	54.6	20.4
San Marino		6037464100	6,221,183	7.4	70.0	14.3	5.6	6.3	20.7
San Marino		6037463500	79	0.4	54.6	18.2	35.0	41.9	30.0
San Marino		6037480002	749	31.4	61.1	19.9	9.7	31.2	30.6
San Marino		6037464200	3,209,668	5.9	80.8	10.9	4.9	53.1	31.1
San Marino		6037463400	16,008	12.6	52.0	35.2	15.8	45.6	32.2
San Marino		6037480202	189,208	19.3	64.4	20.6	18.3	45.6	33.6
San Marino		6037480201	1,211,943	32.6	50.5	21.5	47.0	18.5	34.0
San Marino		6037464000	17,017	9.3	15.6	30.8	71.7	47.1	34.9
San Marino		6037463300	660,501	33.9	76.1	26.7	35.0	29.7	40.3
San Marino		6037431600	19,329	30.0	89.9	15.6	23.8	43.9	40.6
San Marino		6037463200	8,865	26.4	52.9	31.3	22.6	73.0	41.2
San Marino		6037432102	927,583	48.8	80.7	30.8	9.7	47.6	43.5
San Marino		6037480400	22,629	38.1	80.8	41.9	11.9	46.0	43.8
San Marino		6037463102	303,254	51.5	70.3	29.5	8.7	60.9	44.2
San Marino		6037432000	1,499,332	57.5	85.1	42.8	0.9	56.5	48.6
San Marino		6037432101	361,098	58.1	79.0	36.3	41.8	32.3	49.5
San Marino		6037481103	7,761	69.4	89.2	53.3	23.8	33.2	53.8
San Marino		6037481202	410	65.9	91.4	54.4	10.7	54.6	55.4
San Marino		6037480302	3,109	48.0	89.9	56.1	1.1	84.2	55.9
San Marino		6037431501	4,305	55.3	89.5	68.9	19.6	56.9	58.1
San Marino		6037432901	1,134,019	77.1	92.4	51.7	15.8	54.6	58.3
San Marino		6037432902	1,083,945	75.2	77.1	51.1	52.5	35.8	58.4
San Marino		6037432202	1,332,149	77.6	83.8	67.0	4.9	71.2	60.9
San Marino		6037481201	3,735	51.9	96.0	59.8	22.6	80.1	62.1
San Marino		6037481101	202,977	55.5	91.2	62.8	66.6	58.8	67.0
San Marino		6037432300	561,776	85.9	84.9	67.2	52.5	53.6	68.8
San Marino		6037481102	353,361	58.7	98.6	68.5	37.7	92.2	71.1
San Marino		6037433601	224,312	82.5	89.7	63.5	53.9	72.6	72.5

California American Water 2022 GRC Affordability Metrics

District		Tract	Intersect Area	EducatP	Ling_IsolP	PovertyP	UnemplP	HousBurdP	SEVI Score
San Marino		6037481300	195,712	88.6	92.2	53.5	81.0	60.1	75.1
San Marino		6037432801	301,282	93.0	99.6	86.7	17.1	86.0	76.5
San Marino		6037433101	969,439	92.0	97.7	74.0	76.1	86.0	85.2
San Marino		6037432802	592,147	93.2	97.6	92.6	96.5	95.1	95.0
Ventura		6111006800	288	34.4	-999.0	29.0	57.2	18.5	-999.0
Ventura		6111006700	1,934,204	-999.0	21.4	14.3	18.3	22.1	-999.0
Ventura		6111005910	1,449,984	9.0	2.8	8.5	10.7	3.6	6.9
Ventura		6111006200	6,266,818	9.0	4.6	2.2	29.4	2.6	9.6
Ventura		6111005305	2,270,066	6.9	7.4	6.1	23.8	10.2	10.9
Ventura		6111005204	1,111,346	6.9	42.8	3.1	3.6	1.9	11.7
Ventura		6111005801	4,724,813	6.5	26.4	1.2	17.1	11.6	12.6
Ventura		6111005901	3,507,387	14.8	0.5	5.1	32.3	13.6	13.2
Ventura		6111006301	9,210,077	6.5	0.0	10.7	26.9	26.7	14.2
Ventura		6111007300	3,317,762	20.9	1.8	14.0	35.0	9.2	16.2
Ventura		6111005205	1,395,432	23.7	11.3	11.9	18.3	20.6	17.2
Ventura		6111005802	7,319,475	4.7	28.8	14.8	37.7	20.6	21.3
Ventura		6111005911	5,897,053	21.4	32.0	17.7	0.9	41.9	22.8
Ventura		6111006000	3,307,793	15.8	12.3	8.5	57.2	25.7	23.9
Ventura		6111005908	406,544	6.9	10.4	19.9	33.6	50.7	24.3
Ventura		6111005906	4,222	18.4	14.9	12.7	51.3	26.2	24.7
Ventura		6111006600	2,232,882	29.3	0.0	37.6	25.2	36.7	25.8
Ventura		6111005600	454,799	37.3	9.5	31.3	33.6	44.5	31.2
Ventura		6111005909	772,601	30.4	63.3	43.1	25.2	7.7	34.0
Ventura		6111006302	919,032	31.4	30.0	14.3	85.5	16.3	35.5
Ventura		6111005202	791,472	35.5	45.4	14.8	67.5	34.8	39.6
Ventura		6111006900	2,725,908	34.8	36.0	44.9	21.1	84.6	44.3
Ventura		6111006100	10,706,399	42.3	79.0	41.7	63.4	36.7	52.6
Ventura		6111007000	2,572	65.9	77.4	61.5	45.8	51.4	60.4

Attachment 2: PUMAs Overlaying Cal Am Districts

District	PUMAs Overlapping District
Monterey	5301
San Diego	7310
San Diego	7322
Ventura	11102
Ventura	11106
Baldwin Hills	3748
Duarte	3710
San Marino	3717
San Marino	3737
San Marino	3738
Sacramento	6711
Sacramento	6708
Sacramento	6702
Sacramento	6704
Sacramento	6701
Sacramento	6706
Sacramento	6101
Meadowbrook	4702
Larkfield	9701

Attachment 3: Housing Cost Regression Models

Regression variables:

Dependent variable:

hcost = monthly non-discretionary housing cost (mortgage + rent + condo fees + property taxes + property insurance + electricity costs + gas costs)

Explanatory variables:

sqrhincp = square root of monthly household income

np = number of persons in household

_cons = model constant

California American Water 2022 GRC Affordability Metrics

Monterey PUMA
(analytic weights assumed)
(sum of wgt is 64,661)

Linear regression	Number of obs	=	3,454
	F(2, 3451)	=	178.30
	Prob > F	=	0.0000
	R-squared	=	0.1842
	Root MSE	=	1206.7

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	14.06539	.8157392	17.24	0.000	12.46601	15.66477
np	49.70956	16.17841	3.07	0.002	17.98933	81.4298
_cons	599.343	70.58712	8.49	0.000	460.9463	737.7398

San Diego PUMA
(analytic weights assumed)
(sum of wgt is 110,566)

Linear regression	Number of obs	=	5,207
	F(2, 5204)	=	221.09
	Prob > F	=	0.0000
	R-squared	=	0.1792
	Root MSE	=	1267.6

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	14.85927	.7657336	19.41	0.000	13.35811	16.36043
np	44.4749	14.03648	3.17	0.002	16.95749	71.9923
_cons	601.2976	63.13612	9.52	0.000	477.5243	725.0709

California American Water 2022 GRC Affordability Metrics

Ventura PUMA
(analytic weights assumed)
(sum of wgt is 96,397)

Linear regression	Number of obs	=	5,265
	F(2, 5262)	=	322.78
	Prob > F	=	0.0000
	R-squared	=	0.2085
	Root MSE	=	1259.2

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	13.71087	.6387074	21.47	0.000	12.45874	14.963
np	95.88127	14.32354	6.69	0.000	67.8012	123.9614
_cons	632.0564	61.71735	10.24	0.000	511.0648	753.048

Baldwin Hills PUMA
(analytic weights assumed)
(sum of wgt is 84,663)

Linear regression	Number of obs	=	3,393
	F(2, 3390)	=	116.45
	Prob > F	=	0.0000
	R-squared	=	0.1807
	Root MSE	=	1328.4

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	12.55701	.8703982	14.43	0.000	10.85045	14.26356
np	93.60074	27.32968	3.42	0.001	40.01641	147.1851
_cons	1092.413	103.8557	10.52	0.000	888.7871	1296.039

California American Water 2022 GRC Affordability Metrics

Duarte PUMA
(analytic weights assumed)
(sum of wgt is 46,595)

Linear regression	Number of obs	=	2,879
	F(2, 2876)	=	127.35
	Prob > F	=	0.0000
	R-squared	=	0.1425
	Root MSE	=	857.41

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	11.27525	.8287409	13.61	0.000	9.65026	12.90023
np	18.89972	10.25037	1.84	0.065	-1.199093	38.99854
_cons	566.2305	55.29349	10.24	0.000	457.8116	674.6493

San Marino PUMA
(analytic weights assumed)
(sum of wgt is 132,444)

Linear regression	Number of obs	=	7,487
	F(2, 7484)	=	239.51
	Prob > F	=	0.0000
	R-squared	=	0.1312
	Root MSE	=	1099.6

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	11.05118	.6531798	16.92	0.000	9.770765	12.3316
np	69.74673	9.070996	7.69	0.000	51.96503	87.52843
_cons	558.946	46.72773	11.96	0.000	467.3465	650.5455

California American Water 2022 GRC Affordability Metrics

Sacramento PUMA
(analytic weights assumed)
(sum of wgt is 308,910)

Linear regression	Number of obs	=	15,251
	F(2, 15248)	=	841.46
	Prob > F	=	0.0000
	R-squared	=	0.2146
	Root MSE	=	698.69

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	10.45815	.2803794	37.30	0.000	9.908577	11.00773
np	57.78456	4.658395	12.40	0.000	48.65355	66.91557
_cons	421.375	22.16702	19.01	0.000	377.925	464.825

Meadowbrook PUMA
(analytic weights assumed)
(sum of wgt is 49,060)

Linear regression	Number of obs	=	2,392
	F(2, 2389)	=	108.51
	Prob > F	=	0.0000
	R-squared	=	0.1808
	Root MSE	=	581.67

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	8.34527	.6611257	12.62	0.000	7.048831	9.64171
np	46.79361	9.25739	5.05	0.000	28.64026	64.94696
_cons	339.3661	45.75208	7.42	0.000	249.6482	429.084

California American Water 2022 GRC Affordability Metrics

Larkfield PUMA
(analytic weights assumed)
(sum of wgt is 71,908)

Linear regression	Number of obs	=	3,949
	F(2, 3946)	=	219.67
	Prob > F	=	0.0000
	R-squared	=	0.1954
	Root MSE	=	1235.1

hcost	Coefficient	Robust std. err.	t	P> t	[95% conf. interval]	
sqrhincp	13.61013	.8235675	16.53	0.000	11.99547	15.22479
np	118.1997	20.89567	5.66	0.000	77.23237	159.167
_cons	382.3655	66.85053	5.72	0.000	251.3007	513.4304